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AGRICULTURE OF VERMONT

TENTH REPORT

OF THE

COMMISSIONER OF AGRICULTURE

OF THE

STATE OF VERMONT

FOR THE BIENNIAL PERIOD

July 1, 1918, to June 30, 1920

E. S. BRIGHAM, Commissioner.



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LETTER OF TRANSMITTAL.

**OFFICE OF DEPARTMENT OF AGRICULTURE,
STATE OF VERMONT.**

*To His Excellency Percival W. Clement, Governor of
Vermont:—*

Sir:—

I have the honor to transmit herewith the report of the Commissioner of Agriculture for the two years ending June 30, 1920, together with the report of the various societies for the promotion of agriculture.

**ELBERT S. BRIGHAM,
Commissioner of Agriculture.**

REPORT OF THE COMMISSIONER OF AGRICULTURE.

E. S. BRIGHAM.

The following report covers in detail the work of the department of agriculture for the biennial period as it relates to the administration of the agricultural laws and to projects undertaken for the advancement of the agricultural interests of the state.

SUPPRESSION OF INJURIOUS INSECTS AND FUNGUS DISEASES.

During the biennial period the State has been free from any serious infestation of new insect pests. The brown-tail moth, which caused considerable expense a few years ago in our efforts toward eradication, is now practically extinct. In the winter of 1920, however, scouting work done by the agents of the U. S. bureau of entomology revealed the presence of gypsy moth egg masses in a strip of territory along the Connecticut River about the width of two townships and extending from Dummerston on the south to Waterford on the north. The work necessary to be done to hunt out the nests in this infested territory and to kill the eggs was in excess of what could be done by the U. S. bureau of entomology with its available funds. An allotment of \$3,000 was made by the state to supplement the bureau funds in order to carry the work to completion. Reference is made to the report of H. L. Bailey, who has been in charge of insect control, for a detailed account of the work and for a more complete discussion of the general insect situation.

The European corn borer is another serious insect pest which has made its appearance in southern New England and in the state of New York. Owing to the importance of the corn crop to our agriculture, we must take every precaution to prevent its introduction into this state. On July 11, 1919, a quarantine notice was issued forbidding the importation into Vermont of any stalks or ears of corn from the territory infested with corn borer. On April 8, 1920, the following more comprehensive quarantine order was issued and now remains in force.

NOTICE OF QUARANTINE ON ACCOUNT OF EUROPEAN CORN BORER.

Notice issued July 11, 1919, is hereby amended to read as follows:—

An insect dangerous to the corn plant known as the European Corn Borer (*Pyrausta nubilalis*) has been found in some sections of the States of Massachusetts, New York, New Hampshire and Pennsylvania and every precaution should be taken to prevent its introduction into the State of Vermont.

THEREFORE, I, Elbert S. Brigham, Commissioner of Agriculture of the State of Vermont, under authority conferred by Section 431 of the General Laws of Vermont, and with the approval of the Board of Control, do, by this notice of quarantine, order that no stalks or ears of the corn plant, (*Zea Mays*) either green or dried, no broom corn, celery, green beans in the pod, beets with tops, spinach, rhubarb, oat and rye straw as such or when used as packing, cut flowers or entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock and cut flowers or entire plants of gladiolus and dahlia, except bulbs thereof, without stems, shall be moved or allowed to be moved from the States of Massachusetts, New York, New Hampshire or Pennsylvania into the State of Vermont until further notice, unless written permission is secured from the Commissioner of Agriculture of the State of Vermont and such permission shall accompany the shipment. This quarantine, however, shall not apply to ordinary commercial dried shelled corn used for feeding purposes or for seed, provided the same is free from cobs, or to any corn grown in other states passing through the States of Massachusetts, New York, New Hampshire or Pennsylvania in transit.

This order shall become and be effective on and after April 8, 1920.

A campaign of education has been conducted by Mr. Bailey, so that our people will become familiar with these new insects and, therefore, be prepared to assist in reporting their appearance, should any be found in the state.

I would recommend that appropriation be made so that the general scouting work and educational campaign may be continued and that in addition a contingent appropriation be provided for use should these insects get a foothold in

the state. Prompt measures of extermination employed at the outset of an infestation may save millions of dollars in the future.

WHITE PINE BLISTER RUST.

The work in connection with white pine blister rust has been in charge of Chief Forester W. G. Hastings and reference is made to his report for a detailed statement of control measures carried out.

Investigation has revealed that this disease is now widespread throughout the state and has become so firmly established that complete eradication is probably impossible. Therefore, white pine blister rust takes its place alongside potato blight, apple scab and numerous other fungus diseases injurious to our plant life which the individual owner must control. It is in my opinion the function of the state to conduct an educational campaign to show its people how to so control this disease that injury resulting from it will be kept at a minimum. I recommend that appropriation be made so that the educational policy relating to white pine blister rust control as outlined by Mr. Hastings may be carried out during the next biennial period.

APIARY INSPECTION.

J. E. Crane of Middlebury, C. E. Lewis of East Shoreham and F. L. Stearns of North Bennington have served as assistant apiary inspectors during the period covered by this report. The following table shows the work done by these inspectors and reference is made to the financial statement for the expense involved:—

	J. E. Crane	C. E. Lewis	F. L. Stearns
Number apiaries visited	32	100	134
Number diseased apiaries	118 (colonies)	54	28
Number colonies treated	13	36	57
Number colonies destroyed	14	220	22

COW TESTING ASSOCIATIONS.

Cooperative arrangements with the dairy division, U. S. department of agriculture, were continued during the biennial period under which that division contributed toward the salary of a specialist in charge of cow testing associations. The work has been in charge of H. E. Bremer

since the resignation of O. M. Camburn in the fall of 1918. Reference is made to the report of Mr. Bremer on page 47 for a full account of the work done.

July 1, 1920, the dairy division, U. S. department of agriculture, was obliged to withdraw its financial support on account of insufficient appropriation. Upon application to the board of control an allowance was granted so that the cow testing association work could be continued. I recommend that sufficient funds be given the department during the next biennial period so that the work may be continued.

CREAMERY INSPECTION.

The state has been divided into three districts upon the basis of the number of creameries, cheese factories, condensaries and shipping stations, and a creamery inspector has been placed in charge of each district.

The procedure of a creamery inspector in making an inspection of a plant may be outlined as follows:—

1. The plant is inspected as to its sanitary condition and as to the sanitary standards of the methods employed in handling dairy products through the plant. All insanitary conditions and methods are required to be corrected.

2. Inspection is made of the milk or cream delivered by each patron and if any is found which leads the inspector to believe that it is produced and kept under insanitary conditions at the farm, the owner is communicated with or visited and recommendations made which will lead to the necessary improvement. The inspector uses sediment tests, acid tests and solids tests to enable him to judge of the quality of patrons' milk.

3. As often as possible the inspector makes butter fat tests of each patron's milk or cream and mails to the patron a postal card advising him what his test was for the period covered by the sample tested.

4. Moisture tests are made of butter to determine if the moisture content exceeds the legal limit.

5. The apparatus used in making tests, the methods employed in making tests and in computing results are carefully checked over to see if they conform to the laws of the state and the regulations made by the commissioner under such laws. Operators of the Babcock test are examined as to their fitness to operate the test and licenses are revoked if incompetency is shown.

The following table shows a summary of the work done at the plants by the inspectors during the biennial period:—

	1919	1920	Total
Samples tested for butter fat.....	12,673	12,419	25,092
Acidity tests	1,351	8,043	9,394
Moisture tests	215	295	510
Sediment tests	4,506	7,649	12,155
Tests for solids		553	553
Applicants for tester's license examined...		81	81

The above figures show that the inspectors average to run about 12,500 butter fat tests annually. This is equivalent to testing a sample of the milk or cream from each farm in the state about once in two years.

RECOMMENDATIONS.

There is considerable complaint on the part of patrons of creameries, shipping stations, etc. that testing for butter fat is done in a manner unfair to the producer. Experience leads me to believe that the greater part of this complaint is groundless, although there is sufficient basis in fact for it to warrant stringent measures of control on the part of the state. At each session of the legislature there is considerable discussion relative to having the state take over all testing for butter fat, the work to be done by men receiving salaries from the state. Unless the samples of milk or cream were taken by the same men there would be no guaranty of greater accuracy in tests than now obtains, because it would be just as easy for a creamery operator to tamper with samples as with the testing of such samples. In order to do both sampling and testing the state would need a man at each plant, which obviously would be impracticable. We now have a law which provides a strict penalty for crediting a patron with a greater or less percentage of fat than is actually contained in the milk or cream delivered. Our present force of three inspectors is inadequate to do the inspection work required by law and to do the amount of check testing for butter fat to enable dairymen to have their interests properly safeguarded. I would recommend that an additional inspector be added to the creamery inspection force.

REGULATION OF DAIRY MANUFACTURING.

The legislature of 1919 amended Sec. 5942, giving the commissioner of agriculture authority to give such instruc-

tions and to make such regulations as he deems proper concerning the taking of samples of milk and cream for making the butter fat test, the making of such test, and the computing of the results thereof.

Tentative regulations were made under authority granted by the above act in April, 1919, and were mailed to all dairy manufacturing plants of the state with notice that a public hearing would be held at the commissioner's office in Montpelier on May 13, 1919, at which time opportunity would be given interested parties to show cause why these tentative regulations should not go into effect. Several creamery operators were present at the hearing and were very helpful in assisting in making the final draft of the regulations.

A bulletin containing the final draft of the regulations, which were made effective June 1, 1919, was issued and copies sent to all the plants of the state.

These regulations define what kind of apparatus will be allowed in sampling and testing milk and cream, what methods are allowable in sampling and testing and how the results must be computed in order that the payments to patrons may be made upon a fair and equitable basis.

During the year in which these regulations have been effective, I believe there has been a great improvement in the general methods employed at many plants, which has led to a more correct determination of the butter fat content of milk and cream and a more correct method of computing the payment therefor.

DAIRY MANUFACTURING.

Cooperative arrangements with the dairy division, United States department of agriculture, were continued during the biennial period, under which dairy manufacturing specialist V. R. Jones was employed upon the basis of the federal department paying his salary and the state department paying his expenses. Mr. Jones has assisted in organizing cooperative creameries wherever there has been a call for such service and has assisted all creameries when called upon to do so with such problems as remodeling plants, selection of apparatus, handling of milk to keep down its bacteria count, the manufacture of butter, cheese, casein, etc. of the best quality in the most efficient manner. His services have been particularly helpful in assisting milk plants in meeting the requirements of city health boards.

For the fiscal year beginning July 1, 1920, the funds provided by Congress for the support of the dairy division were not sufficient to enable it to continue to pay Mr. Jones' salary. Upon application to the board of control, an allowance from the contingent fund was granted, so that Mr. Jones' services could be retained. I recommend that this work, which is of great importance to our creameries, be continued and an adequate allowance made for its support in the next budget.

FARM BOOK.

Number 15 of the Acts of 1919 provided for a census of farms for sale to be taken through the listers and authorized the use of \$3,500 from the appropriation for the agricultural department and a special appropriation of a like sum to collect data regarding these farms and the publication and distribution of such data in book form. The collection and checking of this data was under the supervision of Amos J. Eaton, who has also done some work in connection with the farm labor problem. The editing of the book was under the supervision of Charles R. Cummings.

Mr. Eaton reports as follows:—

"Carrying out the provisions of No. 15 of the Session Laws of 1919, the listers of the various towns of the state through the respective town clerks, reported to this office a total of 1,400 farms for sale in the state. Of this number the owners of 705 farms replied when questionnaires were forwarded to them.

Late in October a bulletin of 288 pages was issued which was largely a compilation of the information contained in the questionnaires.

On July 1st there had been sold 85 of the 705 farms offered for sale or a trifle over 12%. At that time 6,500 copies of the 10,000 issued had been distributed. A folder has been prepared for each of the remaining 3,500 copies, stating which farms have been sold and any changes in price or condition of sale for those still for sale, with sundry minor corrections, thus bringing the information up to date so far as may be.

During the past year many applications have been received from men desirous of securing employment on farms. Positions have been secured for a good number of these applicants and in the majority of cases they have given good satisfaction."

FARMERS' MEETINGS.

Andrew Elliott of Galt, Ontario, was employed during the fair season in 1918 and again in 1919. Mr. Elliott did judging work at the fairs and gave demonstrations of the methods used in selecting stock. During the portions of the week when he was not engaged at fairs he gave lectures at grange meetings.

Numerous addresses have been given at grange meetings, farm bureau meetings, creamery meetings, etc. by the regular staff of the department.

MARKETING OF FARM PRODUCTS.—EMPLOYMENT OF MARKET AGENT.

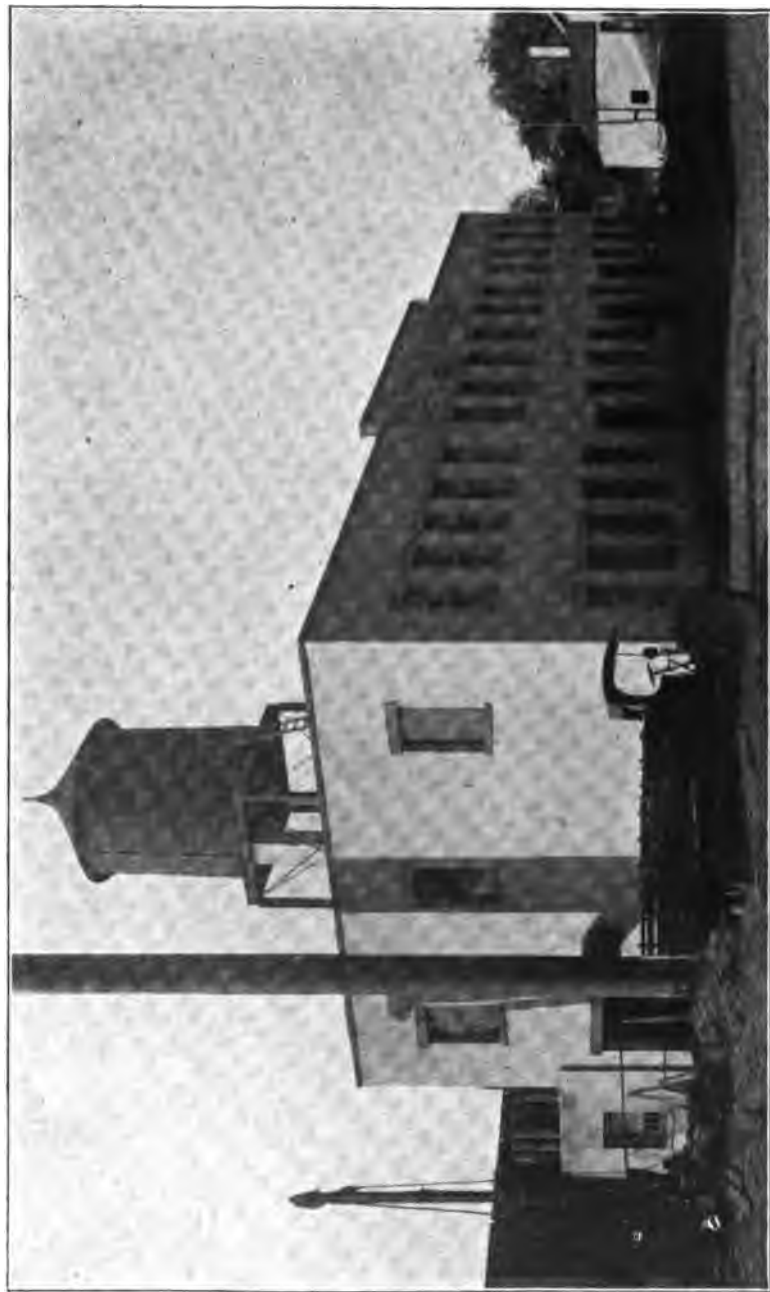
During the biennial period the bureau of markets of the U. S. department of agriculture has cooperated with the state department in the employment of a state field agent in marketing to the extent of paying \$1,200 annually toward his salary. M. R. Tolstrup, who had held the position of market agent since February, 1916, resigned in August, 1919. Mr. Lionel G. Mulholland was appointed in September, 1919, to this position. Reference is made to the report of Mr. Mulholland on page 40 for full particulars regarding the lines of work pursued during the period. I recommend that the marketing work of the department be continued and enlarged to include investigations of problems connected with marketing a wider range of farm crops, including particularly hay and fruit, with a view to securing a better standardization of these commodities and more profitable return for them.



RECEIVING ROOM, MILTON CREAMERY



ROOM WHERE MILK IS PROCESSED, MILTON CREAMERY



PLANT OF THE MILTON CO OPERATIVE DAIRY CORPORATION AT MILTON

This is the largest plant in the state built and owned by farmers.

THE MILTON CO OPERATIVE DAIRY CORPORATION
MILTON, MASSACHUSETTS
1911

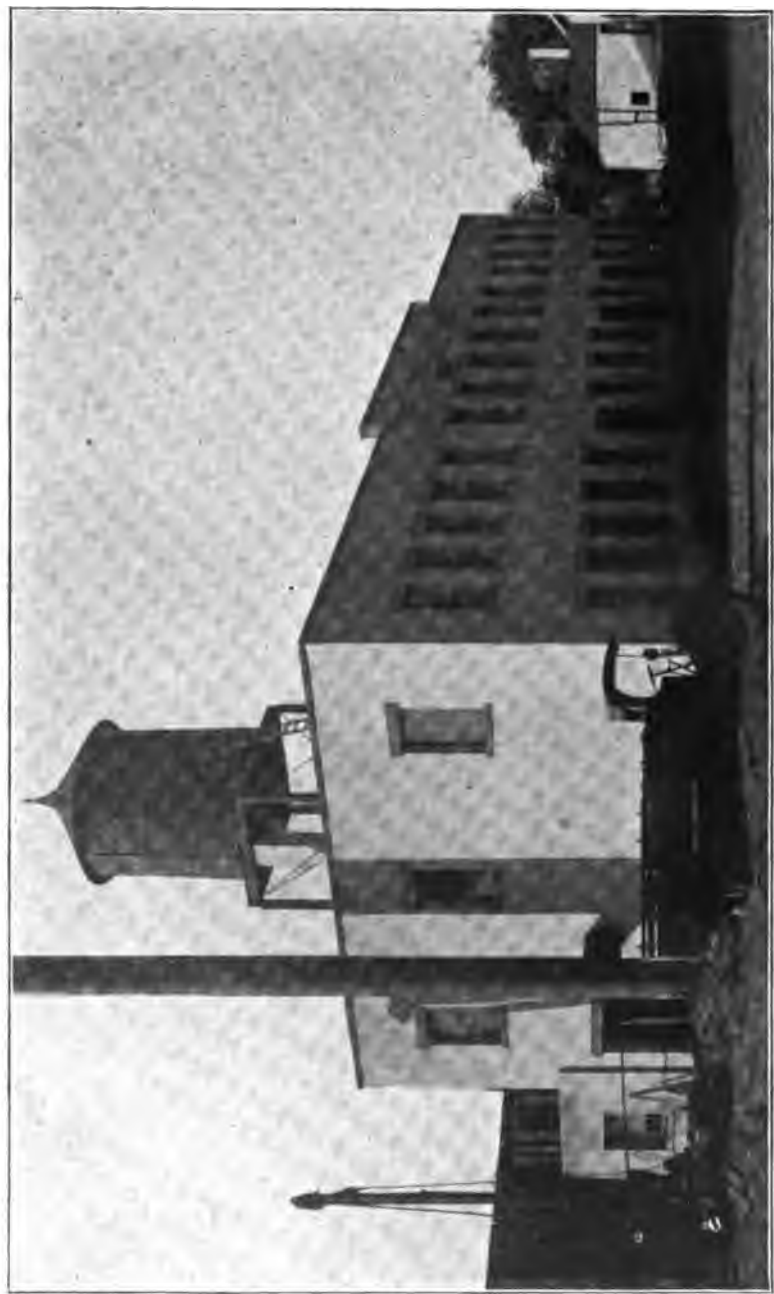
COOPERATIVE MARKETING.

Cooperative marketing of the products of Vermont farms, particularly of dairy products, has made great progress during the past five years. The foundation of this development may be said to have been laid by a decision of the Interstate Commerce Commission and by a law passed by the legislature of 1915.

July 11, 1916, the Interstate Commerce Commission gave out a decision abolishing the so-called leased car system of transporting milk and ordering into effect the so-called open car system. Under the leased car system a contractor engaged a car which started from a certain point on a railroad line. By paying the carload rate from this point to destination the contractor had the privilege of loading or unloading milk at any intervening station at which the train stopped without paying any additional charge. There were in less than carload facilities provided for shipping milk which made such shipments economically possible. Therefore shipment of milk to the city market was limited to contractors who shipped in carloads. The open car system now in effect provides that the railroad shall transport milk cars whenever the amount of milk offered on a line exceeds the any amount of milk shall be received from any way at a per car rate varying with the distance over which it is shipped and that a carload rate with a reasonable margin from the less than carload rate shall be available to those who can ship in carload quantities. This open car system has made possible shipments of milk and cream from co-operative plants to small dealers in the large markets and has given our dairy farmers a much wider outlet for their dairy products.

The legislature of 1917 enacted a law relating to the formation of private corporations. In this act was inserted a section providing that any corporation using the word "cooperative" in its business name shall have in its articles of association the following provisions:—

1. Each shareholder shall have one vote and only one in all matters pertaining to the management of the corporation. 2. The interest or dividends on the paid-in capital stock of the corporation shall not exceed six per cent per annum. 3. There shall be set aside annually not less than ten per cent of the net profits of the corporation for a reserve fund until there is accumulated a fund of not less than thirty per cent of the paid-in capital stock. 4. The remainder of the earnings of any year thereof shall be dis-



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- (4.) The remainder of the earnings or any part thereof shall be dis-

tributed by a uniform dividend upon the amount of purchases or sales through the corporation by the shareholders, or the amount of raw material furnished to or business done through the corporation by the shareholders; said profit or earnings to be distributed as often as once in twelve months. (5.) Not more than ten per cent of the capital stock of such corporation shall be owned by any one member. Certificates of stock in cooperative corporations shall contain a statement on the face thereof that the holder is entitled to only one vote thereon.

This law has made it impossible for outside interests to get control of cooperative plants organized under it by buying up fifty-one per cent or more of the capital stock.

Under this law twenty-nine cooperative dairy manufacturing plants have been incorporated, twenty-seven of which are now doing business. The other two have not yet begun active business. Several of these plants are located on the railroad and are so equipped that standard quality milk may be shipped to the city market or the product may be manufactured into sweet cream, butter, cheese, casein, etc. Apparatus will probably be installed in some of the plants for the manufacture of condensed milk and milk powder. It is our estimate that one-third of the entire dairy production of the state is now being marketed through cooperative plants. The time has probably now come when the farmers of Vermont will never have to accept in time of surplus a price for fluid milk less than its manufacturing value, as was the case when the plants were owned and controlled by the large milk contractors and as was the case in April and May, 1920, in the state of New York where few cooperative creameries have been built.

FEDERATION OF CREAMERIES.

During the winter of 1920 representatives of several cooperative creameries held a number of meetings to discuss the project of forming a federation of cooperative creameries for the purpose of securing for themselves collectively certain services which are out of the reach of the individual plant. On February 24, 1920, the federation was incorporated for \$200,000 in accordance with the laws of Vermont, under the name of the Vermont Cooperative Creameries, Inc.

The by-laws of the federation give its directors power to contract with member creameries in the following matters:—

1. For the supervision of accounting for member creameries.

2. For the buying of supplies for such member creameries.

3. For the selling of products manufactured by such member creameries.

4. To contract with two or more member creameries for the purpose of supervising the manufacture of and selling the entire output of such creameries in such form and manner as the sales manager may direct, the receipts from such sales to be prorated to such member creameries on the basis of the amount of product contributed, subject to such equalization for difference in cost of transportation, quality of product and cost of manufacture as a board of equalization composed of a representative from each contracting member and the board of directors of this corporation may determine; and also subject to deductions for expense as in these by-laws provided.

It is proposed under the accounting contract to employ for the cooperative creameries an expert accountant who will install in each member plant a standard system of accounting, supervise the bookkeeping and render to the directors of the member creamery a complete audit of the books at least once a year.

Under the purchasing contract it is proposed that all member creameries shall purchase their supplies, such as coal, salt, packages, apparatus, etc. through one purchasing agent.

Under the sales contract it is proposed that the federation shall employ a general manager with an office in Burlington to have general supervision of the entire business of the federation. Attached to his staff will probably be a manufacturing specialist, who will assist member plants with all problems connected with the handling of milk and its manufacture into various products. It is further proposed to employ a sales manager with office in Boston who shall look after the marketing of the products of member creameries. It is also proposed to have a laboratory in connection with the Boston office so that milk and cream may be tested for butter fat and for bacteria count, so that cooperative creameries may know through their own employees what is the exact condition of their products upon arrival in the market.

At this writing the required number of creameries had not signed the federation contracts so that it had started active business, but it is hoped that the necessary number will soon qualify.

SEED POTATO INSPECTION.

The present plan of seed potato certification was adopted by the department in 1914. It contemplates that an inspector of the department will visit the field which is entered for certification twice during the growing season and note the condition of the growing crop. Growers in the states to the south of us are practically forced because of the deterioration which takes place in potato seed stock grown in a warm climate to come north for seed. These southern growers want especially seed free from mixtures of other varieties than the one desired and free from the diseases which cause severe losses in the crop yield. Our inspectors note the condition of the growing crop of applicants for certification and if fields are free from mixtures and have a percentage of disease within the tolerances allowed, a certificate is given the grower which shows that the crop is fit for seed according to our standards and also shows the actual conditions found by the inspector, so that the buyer may know from a reliable source just what was found.

It has developed that buyers from states farther south are willing to pay prices for seed stock from certified fields considerably in advance of the prices for table stock, particularly if a trial of the year before has shown the superiority of the certified seed. A splendid business has been built up by some of our more skilled potato growers which is netting them good financial returns and there is a great possibility for further development of this business.

The following tables show the progress of seed certification in Vermont and the financial returns resulting:—

TABLE I.

Showing increase in Potato Seed Certification during the years 1918-20.

	1918	1919	1920
Total number of inspections.....	60	169	206
Total acreage inspected.....	197	375	550
Average area of fields inspected (acres)	3.28	2.21	2.66

Number of fields certified	24	66	89
Number of acres certified.....	87	160	258
Percentage of inspected fields passed.	40	39	43
Average area of certified fields (acres)	2.75	2.42	2.88

TABLE II.

Table showing sales of certified seed in 1919.

Total Sales of Certified Seed.....	20,000 bu.
Average price per bushel.....	\$ 2.18
Total receipts for Certified Seed.....	43,600
Average price per bushel for table stock at dig- ging time	1.35
Average gain per bushel due to certification....	\$ 0.83
Total gain on sales due to Certification.....	16,600

TABLE III.

Table showing estimated crop and estimated gain due to certification in 1920.

Number Acres Certified.....	258
Estimated Yield Per Acre.....	200 bu.
Total Estimated Yield of Certified Seed.....	51,600 bu.
Estimated Average Increase in Price per Bushel.	\$ 0.75
Estimated Cash Gain Due to Certification.....	38,700

INCREASE IN ACREAGE.

During the past three years there has been a large and steady increase in the applications for the Seed Potato Inspection Service and a corresponding increase in the number of acres certified and in the output of certified seed potatoes. Table I gives the figures in detail regarding this increase.

It will be noted that the percentage of increase in 1919 was considerably larger than that in 1920. This was due, in part, to the organization in 1918 of a number of local associations in connection with the extension work under the U. S. department of agriculture and state extension service, and the cooperation given this project by the county farm bureaus as well as the continual encouragement and control exercised by the state department of agriculture.

Further reference to Table I will show that the percentage of inspected fields which passed has increased in

1920, which is an indication of better control of disease. It will also show that the average size of the certified fields has increased. The enforcement of the inspection rules now adopted will result in a further increase in the average size of the fields, which is desirable from the point of view of economy both of production and inspection.

The prospects are for a further increase in number of inspections, acreage, etc., in 1921.

LOCAL AND STATE CERTIFIED SEED POTATO ASSOCIATIONS.

Thirteen local certified seed potato associations are now in operation in the state and a state association has recently been organized whose purpose is to promote the production of more and better certified seed potatoes. The local and state associations will be mutually beneficial in the maintenance of standards of excellence and in advertising and selling the crop.

The figures given in Table II show that in 1919 there was a net financial gain to the certified seed potato growers of the state of \$16,600. These figures are derived from known sales and actual amounts received and from the published market prices of table stock.

In Table III the yield of certified seed based upon inspections now completed, is estimated at 51,600 bushels. The average premium received for certified seed is about \$0.75 per bushel, although some growers have received an increase of \$1.00 per bushel over the price of table stock.

At the conservative estimate of \$0.75 per bushel premium, the cash gain due to certification in 1920 will total about \$38,700.

The inspection work has been done during the two years by H. L. Bailey and A. H. Gilbert, the latter of whom is jointly employed by the University of Vermont and by this department.

NEED OF CONTINUED AND INCREASED FINANCIAL SUPPORT.

The project of developing the certified seed potato business in the state is vitally in need of larger financial support, so that the constantly increasing demands of our potato growers for this service may be met. There is also a demand for seed grain inspection. In my opinion our inspection service should be enlarged to include seed grain with the possibility of securing great financial benefits to our farmers, not only in the higher prices which could be

received for certified seed, but also in the greater yields which would be secured from the use of seed from the better yielding fields.

EXHIBITIONS.

In October, 1919, an exhibition of Vermont agricultural products was made by the department at the Eastern States Exposition at Springfield, Mass. This exposition is the largest of its kind in the east and draws its patronage widely from the great consuming sections of the eastern states which are our principal markets for farm produce. Our exhibit comprised maple products, dairy products, forest products, vegetables including certified seed potatoes, fruit, etc. A sale of maple products enabled us to finance this project, with an allowance of \$1,000 from the agricultural appropriation.

REPORT OF INSPECTOR OF NURSERIES.

M. B. CUMMINGS, BURLINGTON.

All of the trade or commercial nurseries in Vermont have been inspected annually. Almost without exception the nurseries have been found to be clean and free of serious insect pests and plant diseases. It is fortunate that all nurserymen are well disposed toward the inspection work. Their concern for healthy plants and plantations is as great as that of the State. No nurseryman could afford to have his areas quarantined, for it would interrupt his business, and injure his reputation. Every effort is, therefore, being made to maintain healthy plantations. The inspector is always welcome.

The list given herewith is that of fruit and ornamental nurseries that were inspected:—

F. H. Horsford	Charlotte
Baker's Seed House	Rutland
G. E. Hunt	Rutland
E. G. Hunt	Middlebury
H. M. Totman	Randolph
International Paper Company	Randolph
Ordway & Beede	Tunbridge
Geo. H. Mass	Woodstock
A. A. Halladay	Bellows Falls
Geo. D. Aiken	Putney
C. E. Allen	Brattleboro
Hopkins, Florist	Brattleboro
Geo. D. O'Dell	Brattleboro
C. E. Knapp	No. Bennington
Elmer Gove	Burlington
John Wilson	Burlington
A. Gebicke	Burlington
F. H. McFarland	Waterville
Geo. H. House	Beebe
Palmer & Company	Waterbury

The state forest nurseries of Burlington and Sharon were also inspected, and more often than other nurseries on account of the nature of the trees and their possible diseases, together with the importance of forest plantings.

There have also been a number of inspections of imported nursery stock, chiefly bulbs, and inspection of indi-

vidual consignments of plants to permit expressing and parcel posting of small lots.

It is a pleasure to be able to report a clean bill of health for the Vermont nurseries.

REPORT OF H. L. BAILEY.

IN CHARGE OF INSECT SUPPRESSION.

The principal factors entering into the plan of insect suppression as carried out by the Vermont Department of Agriculture are these:—

I. The prosecution of actual hand measures of control where any important newly imported insect appears and threatens to gain establishment in the State, or assisting in such measures by communities or individuals, through investigation and advice.

II. The maintenance of a careful watch or patrol for the presence of such threatening insects as are not now known to be in the state, but may be introduced from other parts of the country where they are serious pests. This involves the establishment and maintenance of quarantine regulations.

III. Studies and observations with a view to assisting in control of native insects wherever unusual outbreaks occur.

IV. The dissemination, through various educational methods, of information concerning insects, so that the general public may be the better enabled to ward off injury from such pests, and at the same time assist in the maintenance of vigilance against the appearance of any new species.

In the following report, the work of this branch of the Department is summarized under the above heads. In the case of insects which have been fully treated in previous publications, references are cited so that there need be no repetition of details.

THREATENING INSECTS WITHIN THE STATE.

The gypsy moth (*Porthetria dispar*), (see Report of 1913,) has been the only insect against which actual hand measures of control have been carried out during the two

years. In my last report I made mention of the fact that after a gradual spread in this direction for more than fifty years the insect had gained an entrance into some of the border towns along the Connecticut River. Last winter many more egg masses were found throughout the eastern towns. Up to the present year the U. S. Bureau of Entomology has carried out all the necessary inspection or scouting work for the gypsy moth in this state, which has been considered "outside territory". That is, the moth has not become so firmly established here as to put any section into the generally infested class. The scouting season of 1918-19 disclosing a considerable reduction in the number of egg masses in adjoining New Hampshire towns, the previously infested territory in Vermont was not completely scouted. But in the fall of 1919 inspection work began to indicate a large spread of the insects into the state, and up to the time that deep snow and extreme cold weather caused a temporary discontinuance of the work egg masses had been found in practically all the towns along the Connecticut from Dummerston to Waterford and in most of those bordering them on the west.

In February, 1920, I attended a conference in Boston, where the situation as presented made it evident that there had been a widespread extension of the gypsy moth infestation throughout New England. So much unexpected work had been required of the federal government in this line that funds were lacking to complete operations here without substantial assistance from the State. Since it appeared urgent that more scouting be done in Vermont an arrangement was entered into with Mr. H. L. McIntyre whereby \$3,000 became available from the appropriation for insect pest and plant disease control. It seemed altogether advisable to employ the trained men of the federal service and five crews of from three to six men each were taken directly over on the state pay-roll. Several local men also were employed and the federal office provided three general foremen, who simply acted as crew foremen. These crews worked in Hartland, Hartford, Thetford, Newbury, Barnet, Ryegate, Woodstock, Waterford, St. Johnsbury, Concord and Lyndon.

The scouting consists of the inspection of the trunks and main branches of all orchard, shade and scattering trees. In general, everything except the forest trees. Investigations have shown that few if any of the egg masses are to be found in the woods until the insects have become firmly established in the orchards.

Most of the infestations found were isolated, or single, masses and they were generally scattered about the towns. This indicates a wind spread of the moth during the summer of 1919. That is, the newly hatched caterpillars, perhaps a sixteenth of an inch long, were caught by a strong wind and borne from some of the more heavily infested regions in New Hampshire into this state. One rather serious colony was located in Hartland where over 200 egg masses were found about a few trees in some reverting pasture land. The situation proved that the insects had been breeding there for one or more years, and had stood the winter's cold all right. So far as possible these eggs were killed by soaking with creosote, but some which must have been scattered among the rubbish on the ground hatched and were found around the ropen-lime bands which we applied to prevent their crawling up the trees. A few, also, were found on the foliage of one tree, early in June. With Mr. P. A. Howell of the federal work, and Mr. E. G. Willard, owner of the land, I cut the tree which was then infested (a red oak), lopped off the foliage and burned it. We also burned over the ground with an oil burner.

I applied ropen-lime bands also at Bradford and at Ryegate, where there appeared to be danger of scattered eggs, but no gypsy moth larvae were found about them.

The state of the infestation as a whole for the coming scouting season, fall, winter and spring, is problematical, but it is likely that there will be at least a scattering of egg masses throughout the eastern border towns. For the protection of our own orchards and forests as well as to fulfill our part in preventing the general spread of this pest, it is highly essential that scouting be thoroughly done in those sections where egg masses are likely to be. Presumably it will be again necessary for the State to cooperate with the Government in this work. Should the infestation, through too favorable conditions for wind spread or other causes, take on much more serious proportions than was the case last season, the allowance provided from the present appropriation will prove altogether insufficient.

The federal quarantine against interstate movement of forest and quarry products, without inspection, has now been extended so as to include Barnet, Ryegate, Newbury, Corinth, Bradford, Fairlee, Thetford, Norwich, Sharon, Hartford, Woodstock, Hartland, Windsor, Weathersfield, Springfield, Chester, Grafton, Rockingham, Townshend, Athens, Brookline, Westminster and Putney. A common misapprehension seems to exist to the effect that there is

state quarantine against the gypsy moth. It is entirely a federal matter.

ELM LEAF BEETLE. (*Gallerucella luteola.*) (See, Cir. No. 4, Vt. Dept. Agri.)

This insect was very plentiful in some of the larger towns in the southern part of the state during the summer of 1919, and I consequently did a considerable amount of work in the way of inspection of the infestations and in interviewing the town and village authorities relative to protective measures. Middlebury village voted to procure a sprayer early in 1919, and did effective spraying that season. Brattleboro and Bennington, presumably because the work of the beetle was less apparent, as a result of the spraying operations, failed to continue this work, with destructive results last season. Bellows Falls, Rutland, Springfield, Windsor and Poultney are all places in which the insect has damaged the elms.

The species seldom becomes so plentiful that all the foliage is stripped from the trees in any one year, but the constant weakening caused by renewed attacks each summer finally results disastrously to the beauty of the streets.

BROWN-TAIL MOTH: (See previous reports from 1913 and Cir. No. 1.)

The brown-tail moth (*Euproctis chrysorrhoea*) against which our principal efforts were directed through several years beginning 1913 is now, to the best of my belief, entirely absent from the state. Unfortunately, however, there has been a marked tendency in southern and eastern New England for the species to gain ground again and it is to be expected that within a few years the brown-tail may make its re-appearance here. The fact that extreme cold weather might again prove of assistance in cutting down their numbers is not a valid argument against strict measures to prevent its re-establishment, for the insect progressed rapidly in work and destructiveness through a period of 20 years before it met with any effective set back, and there is no reason to suppose that it might not flourish through another like period, unless preventive measures are taken.

SAN JOSE SCALE (*Aspidiotus perniciosus* Comst.) (See REPORT, 1913.)

The San Jose scale has been rather a negligible factor during the past two years. I have made inspections about

those points previously known to be infested, but have found no indication of its having spread. On the other hand, while some of the living insects have been found, they are very few in number. In practically all cases the owners seem to have the infestations well in hand, except in case of some of the wild pasture apple trees in Westminster. Such trees, as has repeatedly been pointed out, constitute a menace to the others, and should be removed by the owners.

The colony close to the Massachusetts line in Guilford appears to be completely eradicated; that at Windsor is nearly, if not completely, so. Living specimens were found on but one or two trees at Bennington and at Shelburne, and spraying in Brattleboro has reduced the general infestation there to a gratifying degree.

II. THREATENING INSECTS OUTSIDE THE STATE.

EUROPEAN CORN BORER (*Pyrausta nubilalis* Hubn.) See Cir. No. 3, Vt. Dept. Agri.)

The most important insect to be classed under this head is the European Corn Borer. First discovered in Massachusetts in 1917, it is now found throughout the eastern section of that state, in small adjacent area in New Hampshire and in two sections of New York state aggregating about 900 square miles. Possibly, if not probably, it is present in many other parts of the country where it has not yet been discovered; and since it may easily have been spread through shipments of green corn or many other kinds of garden products its various food plants will bear close scrutiny in this state, especially near the larger towns where markets or hotels may have received shipments of early vegetables from the Boston markets. Although but little data was forthcoming from the Boston market houses, I ascertained, upon a visit there, that at least some such orders had been filled for various points in Vermont.

The borer itself is a smooth, yellowish or flesh colored caterpillar—"worm" it would most commonly be called—, one inch long when full grown. Overwintering in refuse corn stalks, or the stems of other plants in which it works, this larvae changes into the pupae stage early in the spring, and from the pupae into the adult soon after. The adults are yellowish brown moths with a wing expanse which varies from three quarters of an inch to an inch. They do not make long flights nor do they seem to be particularly attracted to lights, but are of that family known as Paralids

which fly up from the grass or plants in which they are resting and alight but a few feet away. Shortly after their appearance the female moths begin to deposit their eggs in little white flakelike masses on the plants, and within a few days the newly hatched larvae may be found, by close observation, feeding upon the blades or leaves and shortly afterward boring into the stems themselves. The damage beginning with their work in cutting off the tassel and thus making incomplete fertilization of the ear, continues in causing the plants to fall down and in riddling the ears of corn themselves. More than three hundred of the borers have been taken from one hill of corn in Massachusetts. In the latter state there seem generally to be two complete broods of the insects during a season. That is, the first brood of caterpillars, or larvae, transform into pupae and they into adults which deposit eggs during August, and the larvae which issue from these eggs develop at the right time to destroy the maturing ears of corn. In the New York infestations but one brood in the season appears to be the rule.

Efforts have been made to advertise the danger of the establishment of the pest in this state, and I have made many inspections at different points where its presence was suspected. Large numbers of specimens, sent in as possible European corn borers, have been identified, but all cases so far have proved false alarms. The County Agents have shown much interest in this matter and have been of great assistance in spreading information concerning the pest.

There are several native species of borers which attack corn, some of which closely resemble the European borer, but none of which ever become plentiful enough to be of general importance. One of these, *Crambus praelectellus* Zinck, severely injured corn at Putney when the plants had first come up. Specimens first received appeared very much like the imported insect, but upon visiting the infestation, I noted a distinct difference in the work and habits. The Stalk borer (*Papaipema nitela* Guen) also carries on similar work, but may easily be distinguished by five dark stripes running lengthwise of its body.

The European corn borer is of that class of insects against which preventive measures only are effective. Spraying or other artificial measures are of no avail. Complete destruction, by burning or otherwise, of the plants in which the larvae are constitutes the only check against the spread of the pest.

Corn is its favorite and most important food plant, but it is known to live in nearly a hundred other plants. It is

therefore necessary that practically every weed and plant with a soft stalk large enough for the larvae to bore within be eradicated wherever thorough control measures are being carried out. The essentialness of nipping in the bud any possible infestation of the insect in this state is manifest.

The quarantine regulation against the shipping into the state of any corn from Massachusetts or New York without a permit from the Commissioner of Agriculture, and the federal quarantine prohibiting the movement interstate of corn and other food plants of the borer from infested areas have been effective safeguards since the danger became known.

OTHER THREATENING INSECTS.

Mention has been made in previous reports of the ermine moth (see 1914 rep't); the leopard moth (see 1914 rep't); the pine shoot moth and the hag moth. None of these have yet been discovered in the state. Three newly introduced insects which are considered of high importance and which have been discovered in comparatively nearby parts of the country are the green Japanese beetle (*Popillia japonica* Newm), now established in New Jersey, the oriental peach moth (*Laspyresia molesta* Busck), found in several of the middle Atlantic states, and the satin moth, genus *Bombyx*, found in Massachusetts.

There are, furthermore, certain other highly destructive insects of the Old World, not yet known to be in this country, but which may have been imported and at any rate should be closely guarded against. Chief among them are the gold-tail moth (*Porthesia similis* Fuessl), the fruit tree pierid (*Aporia crataegi* L) and the lesser bulb fly (*Eumerus strigatus*).

III. SADDLED PROMINENTS, (*Heterocompa guttivitta* Walker.) (See Cir. No. 3, Vt. Dept. of Agriculture.)

The most spectacular insect outbreak of the past two years has been that of the so-called saddled prominent. Specimens of this native insect may be found in the hardwoods of the state any year, but in the summers of 1918 and 1919 they appeared in such numbers that the woodland in some sections of the state was completely stripped of foliage. The attacks seemed to be most severe and to cover wider areas in Guilford and Halifax than elsewhere, but

outbreaks were reported from various parts of Bennington, Windsor, Rutland, Orange and Orleans counties.

The larvae of this species are peculiar in that they are adorned with projections from their heads, when first hatched which, under a glass, resemble antlers. Their bodies are then of a reddish color, but before reaching full growth the antlers entirely disappear and they become of a general greenish color with a purple saddlelike mark on the back. This coloration often varies, however, so that some are of a claret red all over and occasionally the marks are reduced or are entirely lacking.

As no artificial measures are practicable except in limited areas, the checks provided by nature had to be depended upon to put a stop to the destructive work of this species. Of these natural enemies a native calasoma beetle appears to have been the most effective. In investigations which I made in Guilford soon after the larvae had pupated in the leaf mold, I found ten of the beetles in about one square yard of the soil, busily engaged in eating the pupae of the saddled prominent and green striped maple worm. From specimens taken in Strafford, I reared hymenopterous parasites, and it is probable that there are many other species which prey upon them. Presumably also the birds destroy many of the larvae, although in my observations I did not notice any unusual number of insectivorous birds about the infestations. In several instances it was apparent that thousands of the larvae had starved to death on hemlock trees whither they had collected after stripping the leaves from the surrounding hardwoods. At one point I found a solid mass of dead caterpillars crowded into a space between the soil and the face of a ledge beneath a hemlock. Like conditions were reported in the serious outbreak which occurred in Maine about fifteen years ago.

There can be no question but that these attacks seriously injure the trees. The thinned appearance of woodlands which have been twice stripped bear witness to this. Many trees are killed; others lose many of their branches and all are badly weakened. Maple is their prime favorite, and in cases where sugar places have been once defoliated, sugar makers report a great reduction in sap run the following year. What the result will be where the trees survive two or more strippings remains to be seen.

Beech, witch hazel and hop hornbeam appeared also to be in the favored group of food plants. One orchardist in Halifax reported damage done to his apple orchard by these insects, but as I observed several wild apple trees

only partially defoliated in the midst of other trees which were completely despoiled of leaves, the prominent cannot be considered as of great importance from that angle.

Observations prove that these insects attack most heavily foliage on the higher elevations. Frequently sugar orchards and other hardwoods growing on the tops of steep hills may be found entirely bare while trees along the valleys remain in leaf.

From this circumstance a recommendation which is perhaps worth consideration would be a policy of sugar orchard development on lower levels,—a long ranged measure of protection, no doubt,—but the lapses of time between the destructive outbreak of these and many other such insects are likewise long, and if such attacks when they do come, perhaps once in twenty years, are to kill out large areas of maples, a far sighted policy of prevention is worth while. Such a process also would render more feasible spraying or other control operations. Dry dusting with a power blower, now being experimented with by the Federal Government in forest areas for gypsy moth control, may prove to be a practical solution of this sugar orchard protection.

THE GREEN STRIPED MAPLE WORM. (*Anisota rubicunda* Fab.) See Cir. No. 3, Vt. Dept of Agriculture.

The same natural conditions which favor the saddled prominent apparently favor the green striped maple worm, or, as it is known in the adult stage, the rosy dryocampa. This species, however, does not do as complete stripping of foliage as the saddled prominent. It appears to be more evenly spread about the state, and while perhaps more trees are attacked by it few are completely defoliated. It is known to feed only upon maples. Its habits otherwise and the periods of the different stages of its life cycle are practically like those of the saddled prominent.

Rosy Striped Oak Worm, (*Anisota virginensis* Dru.) A close relative of the above known as the rosy striped oak worm has likewise been more than usually plentiful during the past two years. Its principal food plant is oak.

THE FALL WEB WORM, (*Hyphantria cunea* Dru.)

More than a normal number of the webs of this species have been observable upon the branches of most kinds of deciduous trees late in the summer of both 1918 and 1919.

The small white moths have appeared early in June and have deposited their eggs in masses on the foliage. The issuing caterpillars are at first inconspicuous, but as they proceed they spin thin webs over the foliage which they skeletonize, and may, before they attain maturity completely, web in quite a sizeable branch.

The damage they do is not great, but at such times as the present it is well to spray trees, particularly young apple trees, with arsenate of lead early in July in order to destroy the larvae as soon as they hatch.

RED HUMPED AND YELLOW NECKED APPLE TREE CATERPILLARS. (*Schizura concinna* and *Datana ministra*.)
(See Cir. No. 3, Vt. Dept. Agriculture.)

These species which have previously been noted continued to be plentiful through the season of 1918 and '19, though in diminishing numbers. Although always present to some extent, it is doubtful if their work will be much in evidence for several years.

SAW FLIES.

Several species of saw flies have been abundant upon pine and spruce trees, particularly Abbott's sawfly (*Lophyrus abotti*.) Groups of several hundred of the light colored larvae with rows of black dashes along their bodies may be found eating the needles. Spraying with strong nicotine solution, directly upon the insects, is recommended.

Rose chafers. (*Macrodactylus subspinosus*.) These rather common insects have been extremely destructive in some localities. I tried several experiments in control by various sprays, but none seem very effective. Fortunately they cease feeding early in July.

THE TARNISHED PLANT BUG. (*Lygus pratensis* Linn.)

Although an insect of long standing in this country, the tarnished plant bug appears to have very recently developed a taste for potato plants. Throughout seed potato inspection work, these small brownish bugs have appeared extremely plentiful among the vines, particularly about the blossoming period. Somewhat later, they reach maturity and seek hiding places, or migrate to other kinds of plants, for scarcely a specimen can be found about potatoes later than the first week in August.

Their work consists in sucking the juices from the tender tips of the plants and the new leaves, so that these infested portions wilt and dry up. While this injury to the plant is not great in itself, it seems extremely likely that such diseases as Mosaic and leaf roll may be transmitted from diseased to non-diseased plants through their agency. Such infections have been definitely proven in the case of aphids, which also have been more or less plentiful on potatoes in the state. Thorough spraying with Bordeaux and arsenate of lead naturally tends to keep them from the vines, although as they are sucking insects this spray acts as a repellant only.

BLACK BLISTER BEETLE.

Species of blister beetles, chiefly the black Blister beetle (*Epicauta pennsylvanica* DeG.) have been among the insect enemies of potatoes of late, and have attracted much attention. It was these beetles, together with a close relative having stripes along its back, which were known as "potato bugs" before the arrival of the Colorado beetle in the 70's. We see them only in the adult stage, the larvae living within the ground where they are reputed to feed on grasshopper eggs. Groups of these adults, however, congregate upon a plant and strip it very quickly unless thorough spraying is done.

Colorado Potato Beetles (*Leptinotarsus decemlineata*.) This major potato insect has been present in about its usual numbers, but more care in the growing of potatoes as stimulated by the seed certification project involves greater thoroughness and promptness in spraying the vines with poison against these insects.

Flea Beetles of Potato (*Epitrix cucumeris*.) These also demand early attention. A liberal spraying with the Bordeaux-Arsenate of lead spray tends to keep them off, but it is sometimes good practice to scatter airslaked lime also over the plants.

THE PERIODICAL CICADA. (*Tibicen septendecim* Linn.)

Late in the winter of 1919, the U. S. Bureau of Entomology issued statements foretelling the appearance of the periodical cicada or seventeen year locust throughout a large section of the country, including Vermont. I made inquiry of that Bureau as to the probable points in the state at which the insect would appear but learned that

there was but one record, and that a doubtful one, of its appearance in 1902. This was at a point near Rutland. I was not able to find anyone who remembered ever having seen the insects, nor were there any records at the Experiment Station concerning it.

In Circular No. 3, mentioned later, I asked for reports from any who should see the cicadas, but none were forthcoming during the summer. One indirect report came from Bridport in which the singing of large numbers of cicadas was heard at the proper time for this species to be about, but none of the insects were actually seen. We therefore lack a positive record of the presence of the insect in the state. Not all periodical cicadas appear as adults on the same year, but they have been grouped into broods by careful investigators according to the dates when they do appear after their seventeen year period of growth in the ground. As brood X, the one which was looked for in 1919, is the same to which Vermont cicadas would be expected to belong, it appears evident that they have been practically exterminated here.

IV. EDUCATIONAL WORK.

This work has been carried on through fair exhibits, lectures, the publication of two small bulletins or circulars, press notices, exhibition cases placed in schools, personal interviews and correspondence.

The chief obstacle in the way of a more general and better system of insect control is the almost total lack of understanding of insect life in general and the pests at hand in particular by the majority of people. To help overcome this obstacle I have spent considerable time in making up specimen mounts of various kinds of insect pests, showing their different stages and specimens of their work. These I have used in fair exhibits and in the exhibition cases which I have placed in nearly fifty different schools about the state, principally those where agricultural courses are taught.

FAIR EXHIBIT.

The exhibit made up of such specimen mounts, charts, maps, posters, samples of insecticides, pictures, etc., was shown in the fall of 1918 at fairs at Rutland, Woodstock, Brattleboro and Northfield; in the fall of 1919 at Middlebury, Rutland, State Fair and Brattleboro.

EXHIBITION CASES.

These cases, which are briefly described on page 39 of my last report, have contained specimens of some of the most important pests such as the gypsy moth, wherever possible showing all stages of their life histories. The cases themselves, consisting of two sections, $16\frac{1}{2} \times 19\frac{1}{2}$ inches, I have made at times when field work was impracticable. In addition to the list of schools mentioned in my last report I have placed them in the Junior High Schools at Williamstown, Bristol, Bellows Falls, Bennington, Johnson, Montgomery Ctr., St. Johnsbury, No. Bennington, Lowell, Derby, Orleans, Newbury, Stowe, Waterbury and Hyde Park, also the State Normal School at Castleton and the Burr & Burton Seminary at Manchester.

LECTURES.

I have given talks upon this work during the period covered at St. Johnsbury, Fairlee, Bradford, Vernon, Westminster, Putney, Westminster West, Dummerston, West Brattleboro, Waitsfield, Plainfield, Montpelier, Newfane and Middlebury. Most of these were accompanied by lantern slides.

The Department now has a fine set of slides, many of them in color, depicting the European corn borer and its work.

CIRCULARS.

Circular No. 3, issued April 1, 1919, treats of several species of insects which I believed were to be most prevalent within the following seasons, namely, the corn borer, the saddled prominent and green striped maple worm, the red humped and yellow necked caterpillars and the periodical cicada. 3,000 copies were issued and widely distributed.

Circular No. 4, issued Feb. 1, 1920, is devoted entirely to the elm leaf beetle. 2,000 copies were printed. Especial care was taken to place them in the hands of village, city and town officials in the infested sections.

PERSONAL INTERVIEWS AND CORRESPONDENCE.

Whenever it appeared advantageous to do so, I have personally inspected reported outbreaks of insects, and have personally interviewed the owners or occupants of infested territory. I have also identified a large number of insect

specimens sent through the mail, and furnished the correspondents with such information as was available.

RECOMMENDATIONS.

It is not possible to state accurate figures as to the amount of money saved the property owners of the state by work of insect control. We do know, however, that had there been in Massachusetts fifty years ago nothing more than a general inspection by one or two men together with such assistance as might emanate from the public as a result of educational propaganda, the infestation of the gypsy moth would have been detected when it was still possible to exterminate the pest; and some seven or eight million dollars already spent in fighting it, together with untold damage to orchard, forest and ornamental trees would have been saved. The same, under varying circumstances, may be said of the San Jose scale, and almost any other important imported pest.

Some insects are now beyond the stage of extermination, but may be controlled by reasonable care; others may at any time be found within the state and may, so far as we are concerned, be exterminated. To relax vigilance in this work would be equivalent to letting our insurance lapse while the sparks were flying upon our roof.

The damage done by native insects, or those of long establishment here, has come to be looked upon as more or less a necessary evil, but by prompt application of simple remedies many thousands of dollars might be saved in the state each year. The results of investigations and advice given in this field alone may well be worth much more than the cost of this branch of the Department.

One half of the \$10,000 appropriation for insect control and fungus disease control has so far been sufficient for carrying on the work, but provision should be made for emergency work, either in case of a much heavier infestation by the gypsy moth or the appearance of any other important pest.

WHITE PINE BLISTER RUST.

Up to April 1, 1920, about 45% of my time was taken up in white pine blister rust control, under Chief Forester Hastings. With the necessity of employing and superintending gypsy moth crews and an increase in the seed potato certification work, it was necessary that the blister rust work be transferred to an agent who could devote his whole

time to the project. The report of this work for the biennial period will be found in connection with Chief Forester Hastings' report.

FINANCIAL STATEMENT.

Salary, Harold L. Bailey, 2 years,	\$3,600.00
Expenses, including travel, postage, express, etc.,	2,050.10
Wages of gypsy moth scouts,	2,362.30
Traveling expenses allowed gypsy moth scouts,	39.97
	\$8,052.37

Of the above amounts \$1,420.31 in salary and \$805.15 in expenses were charged against white pine blister rust account.

REPORT OF V. R. JONES.

DAIRY MANUFACTURING SPECIALIST.

The following is a brief report of work in dairy manufacturing for the biennial period ending June 30, 1920.

The service given in dairy manufacturing to the creameries in Vermont for this period has been continued under the project developed in 1916, in which the Dairy Division of the United States Department of Agriculture and the State Department of Agriculture conducted and financed this work cooperatively.

NEW COOPERATIVE FACTORIES.

The demand for assistance with creamery problems has increased to such an extent that it is not now practicable for one man to give the service in this work to which the factories are entitled, and should have for the next few years. This is due mainly to the fact that during the past two years the farmers have organized some fifteen creameries which are now owned and operated by them. These factories have been assisted with their organization, management, operating problems and the securing of suitable help.

WHY HAVE FARMERS ORGANIZED COOPERATIVE DAIRY PLANTS?

There is no doubt that the larger percentage of surplus during April, May and June, and the fact that the farmers

receive their pay for milk on that basis from the big dealers, have created a desire or movement among the farmers to own and operate their own factories in Vermont, whereby this surplus can be made into manufactured products at a less cost and usually in greater returns. It is also apparent that if the new cooperative plants, now numbering twenty-nine, had not been organized, the returns for their products would have been no doubt less than what they received. In this connection, it is interesting to note that an average price paid for butterfat by twelve cooperative factories and twelve proprietary factories was computed and it was determined that the cooperative plants received for the year 1919, 3.1 cents more per pound butterfat than was paid by proprietary companies. The total value of dairy products sold by these new cooperative factories approaches closely \$6,000,000 or about one-quarter of the total value of dairy products sold from Vermont. This amount is such that it has considerable bearing on the markets.

INVESTIGATIONAL WORK.

Investigations have been made from standpoint of quality and results obtained from bacteriological analyses indicate that in cases of poor quality of milk and cream, the chief causes have been unclean cans and improper cooling of the product at the farm and before shipment to market.

In handling the surplus milk during the past season, cheeses have been manufactured some from whole milk, some from skim milk and some from full skim milk. Considerable quantities of casein also were made. Neither cheese nor casein has been a profitable product to manufacture during the past surplus period. In the manufacture of cheese containing butterfat, the cost of manufacture, figuring the high price of fat, left the value of skimmilk so used not much better than the value of skimmilk for feeding to stock. Efforts were directing toward the saving of milk albumen, a by-product from the whey in the manufacture of cheese and casein, to be sold as poultry food, but the manufacture of this product, with market price of \$100 to \$120 per ton, with a yield of one-half to three-quarters of a pound of albumen per hundred pounds of whey, and considering the cost of manufacture, did not warrant the expense involved.

MANUFACTURE OF SKIMMILK POWDER.

It is the opinion of the writer that the most profitable disposal of skimmilk during the surplus period is in the manufacture of skimmilk powder. Considerable amounts of skimmilk powder are now used on the markets during the short period, by converting this product together with butterfat and water into market milk. At a recent meeting held by several of the creameries interested in the surplus problem a proposition was presented to them by a representative of a Connecticut dry milk company whereby all the skimmilk condensed would be received from the several factories and manufactured into skimmilk powder at some central point in Vermont. This matter is being considered by a number of the cooperative plants and it is quite possible that a large portion of next year's surplus skimmilk will be manufactured into this product.

INSTRUCTIONAL WORK.

Assistance in instruction was given at two creamery short-course schools held at the University of Vermont. Forty-six students were instructed in the testing and the manufacture of dairy products during these courses. Most of the students who enrolled in this work had had previous experience in creameries and apparently the students were very much interested in this work and much benefit was received. It is planned that this phase of the work shall be continued this year.

Eighty-two creamery meetings were attended and addressed on subjects pertaining to the details in the organization of cooperative plants, the production, handling and marketing of dairy products.

CREAM AND BUTTER SCORING CONTESTS.

Two cream scoring contests were held at one factory for the purpose of improving the quality of cream. Seventy samples of cream were delivered to this plant by the patrons and were scored on quality basis and the results and comments were given to each patron. Prizes were given for the three highest scores and at a meeting of all the patrons, advice and instructions relative to the care and handling of cream were offered.

The results of these two scorings showed considerable improvement in the quality of cream and particularly in the

quality of butter manufactured. It is planned that contests of this nature be held from time to time at factories where desired and most needed.

Two hundred thirty-seven samples of butter were scored, which included the samples received for the regular butter scoring held at the University of Vermont. Butter was scored at the creameries and on the markets.

Assistance was given to the butter makers wherever needed with the manufacture of butter to improve its quality and workmanship according to recommendations made at these scorings. On account of lack of funds it was necessary to discontinue the regular butter scoring contests held each month. It is to be regretted that this work had to be discontinued, for the creameries had taken a great deal of interest in these scorings and much benefit was received by the butter makers.

In this connection, it is the opinion of the writer that the regular monthly butter scoring should be continued, and it is suggested that a plan be worked out whereby all the creameries interested in having their butter scored each month should forward their samples to some one plant. The scorings could be held at a different factory each month and in so doing the different creameries would receive much information relative to the quality of butter manufactured by other factories and would note in particular the criticisms given.

CREAMERY CONDITIONS IN VERMONT.

Considerable improvement has been noted during the past two years among the creameries along the lines of more sanitary conditions, installation of modern equipment, more efficient methods of manufacture and a general improvement in construction and remodeling of factories. During the past year more than \$200,000 has been expended in the construction of four new cooperative creameries. These plants are all equipped with modern machinery and are in a position to market fluid milk or cream, and manufacture cheese and butter.

The new factories which have developed during the past three years are giving more attention to the business management of their plants and particularly to the auditing of their accounts regularly. Heretofore, it was very seldom that a creamery would secure an expert accountant to audit its books, but the creameries have now learned the importance of this work.

MORE EXPERIENCED CREAMERY HELP NEEDED.

The dairy industry in Vermont from the standpoint of marketing dairy products has experienced almost a complete change in the methods of creamery operation. A plant having suitable shipping facilities must now be equipped and able to market milk and cream, manufacture cheese and condensed milk, as well as manufacture butter. In order to operate a factory with greatest success the operator must necessarily be familiar with almost every phase of manufacturing dairy products. The help problem in our creameries since the growth of the new cooperative factories has been particularly difficult. This condition is due partly to insufficient salaries offered and partly to difficulty of obtaining in Vermont men who are qualified for this work. In this connection, this Department has advised in several cases that the manager or operator be paid a bonus from one-tenth to three-tenths per cent of net returns to the farmers in addition to his salary. This plan has met with very satisfactory results in creating an incentive for improving the quality of products, reducing operation costs, improving business methods and encouraging in general the development of the local creameries.

METHODS OF TESTING IMPROVED.

The amendment to the general laws of the state relative to testing dairy products, passed at the last session of the Legislature, giving the commissioner of agriculture authority to issue instruction and formulate regulations concerning the sampling and testing of milk and cream, has corrected the faulty methods in testing these products at our factories. This amendment as well as that concerning the licensing of milk and cream testers put into effect through the creamery inspection force and under the supervision of the commissioner of agriculture has met with approval in general by all the creameries.

I would recommend that another step be taken by this Department and that at the next session of the Legislature the testing law be amended further so as to require each delivery of cream to be tested for percentage of butter fat.

REPORT OF STATE FIELD AGENT IN MARKETING.**LIONEL G. MULHOLLAND.**

Under the cooperative agreement between the United States Department of Agriculture, Bureau of Markets, and the Vermont Department of Agriculture the marketing activities in the state have continued during the year although there has been a change in the personnel of the Department. The present Field Agent in Marketing began his duties in the State on September 15, 1919. At first the principal endeavor was to become acquainted with the general marketing conditions in the state. Suggestions were offered as seemed practicable and feasible for the improvement of marketing conditions and methods as applied to dairy and other agricultural products.

First efforts were directed toward a better understanding of creamery conditions in the State by visiting many of the creameries, inspecting the factories and becoming personally acquainted with the managers and buttermakers. To secure further information in regard to the marketing of dairy products a card index system has been established listing the conditions as found existing at each factory visited. These reports show the amounts of products handled, the style of packages in which marketed, the cities and dealers where marketed, the average prices paid and other information regarding operations at each factory.

The greater part of the work is devoted to the interest of the dairy plants as regards their market problems and in assisting in the organization of new cooperative plants. The assistance rendered in marketing consists chiefly in direct service, which activities extend into every section of the state. Whenever requested, assistance is given to any one asking for help with their market problems.

In order to keep in touch with the movement of the various agricultural products into the different markets, the requirements of each market, and to secure new and additional outlets for the different agricultural commodities produced and manufactured in the state frequent visits are made to the market centers. The plan is to visit the Boston and other New England markets, and the New York City market, once every month or six weeks.

As suggested, the work is discussed under the following heads:—

- (1.) Investigations.
- (2.) Organization.
- (3.) Demonstrations and extension work.
- (4.) Service work.
- (5.) Publications.

INVESTIGATIONS.

Problems under consideration and investigation with the purpose of assisting the producers in bettering their market conditions and methods are as follows:—

DAIRY PRODUCTS SHIPMENTS TO NEW YORK CITY.

It appears that more of the dairy products in the state, particularly the products manufactured by the factories in the western half of the state, could be profitably disposed of in the New York City market. Daily milk train service and express service over the Rutland and New York Central lines afford excellent transportation facilities for many of the factories. Interviews have been had with the officials and superintendents of milk service of the different lines, and with officials of the New York City Board of Health relative to the movement of milk and cream shipments and the sanitary regulations on all shipments into that city.

During the past year several of the creameries have made satisfactory connections with butter and cheese dealers and at present regular shipments are moving to that market. Little has been done by the factories on milk and cream shipments but as soon as the Board of Health requirements are met several of the plants will be in a position to make connections with milk distributors in that market.

DISPOSITION OF SURPLUS MILK.

The problem of handling the surplus production of milk profitably is still a large one. The surplus season in Vermont is extending over a longer period of the year than it has heretofore. This is due chiefly to the fact that there is an increasing number of winter dairies together with many of the summer dairies changing to winter dairies. The problems relative to the disposition of surplus milk, especially skim milk, are being studied and are receiving considerable attention. Market demands and prices are

the chief determining factors as to what products can be most advantageously manufactured from the milk that cannot be disposed of at market milk prices. The following products have been manufactured in different localities as a means of disposing of the surplus milk.

CHEESE.

The market demand for Pot and Baker's cheese is increasing slowly and several of the creameries have been able to dispose of their surplus skimmilk in this form. The demand for this product is, however, still limited and the returns are small. The yield of cheese varies from 12 to 15 lbs. per cwt. of skimmilk, and the cost of manufacture is approximately 1c per lb. of cheese manufactured. With the market price ranging from 4c to 5½c per lb. of cheese the net returns per cwt. of skimmilk vary from 50c to 70c during April, May and June.

CASEIN.

Many of the plants have manufactured casein. The returns from this product are even lower than those from cheese, but by manufacturing some saving has resulted. The yield of casein will vary from 2 to 3½ lbs. per cwt. of skimmilk. The market value ranges from 10c to 13c per lb. for the dry, and 7½c to 9c per lb. for the wet or green curd, depending on quality. After figuring cost of manufacture of 1c to 2c per lb., the net price per cwt. of skimmilk is approximately 30c.

ALBUMEN.

Investigations have been conducted regarding the manufacture of albumen as a possible means for the profitable disposition of the surplus skimmilk. This product is in demand by manufacturers of poultry feed, but the investigations show that the net returns are too small to warrant its manufacture unless the factories manufacturing it could at the same time obtain the milk sugar. Cost of equipment for milk sugar prohibits the plants from carrying this work on at the present time. The net returns on albumen figure approximately 5c to 8c per cwt. of whey.

CONCENTRATION AT CENTRAL POINT.

It seems that the best method of disposing of surplus skimmilk would be to condense it at the several plants and

then ship the condensed product to a concentration point where it would be manufactured into milk powder. The product could be disposed of as bulk condensed skim-milk or made into skimmilk powder according to the market demands at time of manufacture. The cost of equipment is not excessive and several of the larger factories at the present time are considering the installation of condensing equipment.

After results in condensing have been obtained it would seem advisable to consider the erection of a centrally located plant equipped to convert the product into milk powder. This problem is receiving attention at the present time.

UNIFORM GRADES FOR HAY.

The problems connected with the profitable marketing of hay are beset with difficulties. These difficulties are due to the variations in grades in the different markets and a lack of uniform inspection service.

With a total production of 1,456,000 tons in Vermont in 1919 valued at \$29,266,000 it seems that assistance can be rendered the farmers of the state in the establishment of standard grades which should result in a better understanding between the producers and buyers, and increased returns to the farmers.

It is planned to carry on investigations in this work during the coming year.

ORGANIZATION.

The growth of the farmers' cooperative creamery organizations in the state has been rapid but steady. All these plants are making rapid strides and are gaining strength slowly but surely, and are the solid foundation upon which is being built the great dairy industry of the state. Assistance has been rendered the following plants and communities desirous of starting cooperative creameries:—

The farmers in the vicinity of Brattleboro who have for some time been shipping their milk cooperatively organized on June 5 as the Windham County Cooperative Milk Producers, Inc. Plans for the construction of the new plant are under consideration.

The milk producers in the vicinity of Norwich are desirous of opening a cooperative creamery. One meeting has been held and plans made for a thorough investigation relative to the advisability of starting a cooperative plant at that point.

The farmers of Prosper vicinity have asked for help in forming a cooperative cheese factory or creamery. One meeting has been held and at present a committee is making a survey of that section to determine the number of cows available.

The milk producers in the vicinity of Highgate held several meetings relative to the opening of a creamery but after investigations it was decided best for the producers in that section to take stock and join with the newly organized plant at Swanton.

At Huntington the dairymen held an organization meeting to discuss the problems relative to the organization of a cooperative plant, and the purchase of the proprietary creamery now in operation. Investigations proved that majority of producers was not in sympathy with the movement.

The farmers of Randolph and vicinity are desirous of forming a cooperative milk producers' association. A survey of the territory is now being made. One thousand cows have already been subscribed. Two meetings have been held.

Plans are under consideration and investigations being made for the organization and establishment of shipping associations for the apple growers in the Champlain Valley Districts. These associations will be formed as county organizations or in some instances as several separate organizations in each county.

Work on the organization of the maple sugar growers is now under consideration and it is hoped some organization will be effected before the next season for the apparent need of organization and cooperation of the producers of maple products in the proper grading, packing, standardizing and handling of their sugar and syrup has been more noticeable this spring than ever before. During April two meetings were held, at which representative growers from Franklin, Chittenden, Lamoille and Addison counties were present.

On June 29 the farmers in the Barre district voted to organize a cooperative creamery. Two thousand one hundred cows have been subscribed. The organization meeting is scheduled for July 10.

EXTENSION WORK.

During the year creamery organization meetings, annual creamery meetings, wool growers' meetings and maple sugar growers' meetings were attended and addressed

on organization and subjects pertaining to better marketing. Conferred and advised with directors of dairy plants, county agents and farmers for the purpose of discussing with them their market problems.

Addresses were given at fifteen meetings during the year. The total attendance at these meetings was 909 and the average attendance 70.

Assistance was given the dairy plants with accounting systems and with the problems of properly weighing, packing, shipping and storing their products.

A complete set of photographs for lantern slides has been obtained, showing the marketing and distribution of dairy products. Photographs were secured while on the different markets, principally the Boston market, in cooperation with the market officials of the states of Maine, New Hampshire and Massachusetts and the Agricultural Committee, Boston Chamber of Commerce. Some slides were made from photographs secured from the Bureau of Markets. These slides are of great value for use at the creamery meetings.

It is hoped that slides showing the marketing of hay and vegetables will be obtained during the coming year.

SERVICE WORK.

Approximately twenty-four creameries were assisted in obtaining better additional outlets for their products. Outlets were obtained for milk, cream, butter, cheese, skim-milk and casein.

The following table shows the actual increase in dollars to one of the cooperative creameries. The increase is due to (1) improvement in quality of products; (2) better markets and higher returns obtained through improvement in quality.

Month	Butterfat Sold (lbs.)	Gross Rec'ts from Butterfat	Av. Price per lb. Butterfat	Av. Monthly Butter Quotation	*Av. Fat] Price less handling chg.	*Diff. †Cents	Value Increase
Sept.	10,777	\$ 7,229.48	\$0.670	\$0.5735	.615	.0415	\$ 447.25
Oct.	10,222	8,305.84	0.812	0.6296	.757	.1274	1,302.28
Nov.	8,882	7,842.08	0.882	0.6736	.827	.1534	1,362.50
Dec.	10,867	10,070.25	0.926	0.7067	.871	.1643	1,785.45
	40,748	\$33,447.65					\$4,897.48

*Handling charges were approximately 5.5c per lb. fat.

**Difference represents increase in cents per lb. fat received over the Butter quotation. Prior to this plant being operated as a cooperative plant the patrons received the Boston Chamber of Commerce quotation for all butterfat delivered.

Farmers have been assisted in obtaining markets for beans, maple products and other produce. Timely marketing information has been disseminated to county agents and farm bureau managers through special reports. At other times these agents are furnished with market information, whenever requested.

During the railroad strike in April six of the creameries were assisted in shipping butter to the New York City market by parcel post. Approximately 17½ tons of butter were shipped through the mails. Comparison of prices on the Boston and New York markets during that period show that these shipments netted the creameries profits in excess of those which would have been received had the butter been disposed of on the Boston market.

By frequent visits to the markets a connecting link is formed between the creameries and shippers of other produce and the dealers and merchants. Assistance is rendered the shippers by pointing out and helping to remedy any defects found in marketing their products. The dealers seem to appreciate the value of the marketing service as it enables them to secure supplies by making connections with shippers who can furnish them with the quantity and quality desired.

Assistance has been rendered several creameries with their accounting work.

A card index listing the names and addresses of the leading dealers in agricultural products and manufacturers of supplies serves as a ready reference in assisting those who are seeking new and additional outlets for their products.

PUBLICATIONS.

The Vermont Creamery and Market News Letter is issued each month from this office. These letters contain information relative to the manufacturing of dairy products and timely information regarding the marketing of farm products, particularly dairy products, and other marketing information. The first issue appeared in May, 1920.

Through cooperation with the Market News Service, Bureau of Markets, the Department issues telegraphic reports and quotations several times weekly, on potatoes and maple products during the marketing seasons of these products. These quotations are disseminated to the various newspapers in the state and are of much value and interest to the producers of these products.

BIENNIAL REPORT OF COW TESTING ASSOCIATIONS, JULY 1, 1918—JUNE 30, 1920.

H. E. BREMER, IN CHARGE COW TESTING ASSOCIATIONS.

When the writer took charge of the associations in October, 1918, there were twelve active and six that had become inactive since July 1, 1918. They were not in the best of condition due to the fact that many of the testers had enlisted and some had been replaced by temporary and rather untrained men. In spite of this fact, twelve of the eighteen operating July 1st, 1918, completed the year satisfactorily. Four of the six defunct associations have been reorganized, two of which have since completed a year's work.

TABLE I.

Comparison of the Average of the 12 Vermont Associations in 1918-'19 with the ten that have completed the year to date (July 1, 1920) in 1919-'20.

Year	No. Cows	Lbs. Milk	Aver. 1st	Lbs. B. F.	Value of Product	Cost of Roughage	Cost of Grain	Income Above Feed Cost
1918-'19	5015	4935	4.15	205.1	\$ 131.77	\$ 35.02	\$ 27.66	\$ 69.09
1919-'20	4318	4952	4.34	215.1	158.61	40.91	37.85	79.85

In figuring the results of the associations in 1918-'19, it was found that in only three (Lamoille Valley, Rutland and White River, which have been operating longer than most of the others) did the cost of grain exceed the cost of roughages fed to the average cow. With this higher grain cost, the 1302 cows in these three groups averaged 18 pounds more butter fat and not only paid for the extra grain but returned \$8.72 more per cow above the grain cost than the 3713 cows in the nine other associations. This again emphasizes that cows fed liberally and intelligently will pay better than cows fed sparingly. Results show that herds receiving 1500 to 2000 pounds of grain per cow are paying better than those fed less. The kind and quality of the roughage is an important factor. Where legume, hay and silage are fed properly, the amount of grain can be decreased accordingly.

In 1919-'20, the grain cost was greater in six associations than the roughage cost while in four associations the reverse was true. For a comparison of average production and feed costs the following table is given.

TABLE II.

No. of Associations	No. Cows	Lbs. Milk	Aver. Test	Lbs. B. F.	Value of Product	Cost of Roughage	Cost of Grain	Income Above Feed Cost
6	2498	4848	4.62	224.4	\$ 158.52	\$ 33.40	\$ 40.31	\$ 84.81
4	1820	5093	3.98	202.9	158.72	51.21	34.46	73.05

INVESTIGATIONAL WORK.

An effort has been made to analyze the various association summaries and records to establish and supplement facts with figures. Insofar as reliable figures are available for past years, they are used; but recent figures are more applicable to present conditions and hence more valuable.

In the Washington County Association which has been operating two years the following tables have been made for the year ending May 23, 1920.

TABLE III.

Relation of freshening date to Income above Feed Cost.

Washington County, 1919-'20.

		Number Cows.	Lbs. B.F. Per Cow.	Feed Cost Per Cow.	In'ne Above Feed Cost Per Cow.
Fall	Sept. Oct. Nov.	67	261.9	\$116.97	\$91.16
Winter	Dec. Jan. Feb.	91	246.7	109.78	85.84
Spring	Mar. Apr. May	77	219.2	91.54	69.28
Summer	June July Aug.	18	213.8	105.98	58.28

The above table shows that it paid Washington County farmers to breed their cows for fall freshening but that the fall season was their third choice, more cows freshening in winter and spring than in the fall. Butterfat production was not only greater from fall cows but prices received for product were greater, which more than offsets the winter grain bills.

TABLE IV.

Relation of pounds of grain fed to income above feed cost.

Washington County, 1919-'20.

Number Herds.	Average Pounds Grain Per Cow.	Income Above Feed Cost.
3	335	\$48.41
7	1235	62.09
4	1841	85.17
4	2338	63.10
2	3316	30.66

The above table is proof that as the amount of grain fed increases to a certain figure, the income above feed cost also increases, but there was a limit to the amount of grain that a cow used to advantage. The four herds that were fed an average of 2338 pounds of grain per cow realized about the same income over feed cost as the herds receiving 1235 pounds per cow, but when purebred cows are owned there is an added advantage in feeding heavy because milk production is greater and the offspring from such stock sells for considerably more money, especially where cow testing association or advanced registry records are used in the sale of the animals.

TESTERS.

One of the commonest drawbacks to cow testing association development in Vermont has been the difficulty of securing competent testers. The salary that testers receive at present compares favorably with that which men with the same training received in other lines of work. The practical experience in feeding, breeding and other

phases of herd management in a cow testing association cannot be overlooked by any young man who proposes to take up practical agriculture. Probably the standard of the testers is higher at present than it has ever been, as four men have had a college training and seven an agricultural school course. Undoubtedly this factor is responsible for the high grade of work that is being done throughout the state.

PUBLICITY.

In most associations, a report of the quality cows is made by the tester each month and this report together with a suggested ration is often printed in the local Farm Bureau paper, the daily press and the dairy journals.

Exhibits illustrating the results obtained by using purebred and scrub sires have been placed at one or two of the county fairs. Since this is educational as well as publicity work, it could well occupy a more prominent place at our local fairs.

A regular monthly circular letter has been sent to all the cow testing association members in the state for several months. Considerable interest has developed in the various associations to see which association herd or individual cow would lead the state during each month. A friendly competition has developed which has led men to more rational systems of feeding. Results in most sections show an increased production over a year ago, due mainly to more regular care and liberal feeding.

It is planned to publish the ration which is fed to the highest butter fat producing herd in the state each month. This will emphasize to the poorer feeders the profit that can be realized when cows are fed proper rations in liberal proportions.

ACTIVE ASSOCIATIONS JULY 1, 1919.

Name of Association	Organized	No. of Mem- bers	No. of Cows	Tester
1. Craftsbury	1911	19	367	Percy E. Bassett
2. Enosburg	1910	25	632	S. A. Chandler
3. First Addison	1911	26	562	Ralph E. Corliss
4. N. Chittenden	1910	24	496	C. N. Howe
5. S. Chittenden	1910	18	555	Norman Reissig
6. Lamoille Valley	1910	21	459	Ernest Longmore
7. Orwell	1917	25	479	Paul C. Howe
8. Rutland	1910	21	613	W. D. Walden
9. Washington Co.	1918	23	406	Earl M. Maxham
10. White River	1908	16	365	Walter E. Parsons
11. N. White River	1919	30	397	L. E. Hardy
12. White Rock	1919	27	498	Clarence Wheeler
Total		275	5829	

ACTIVE ASSOCIATIONS JULY 1, 1920.

Association	Year Organized	No. Mem- bers	No. Cows	Tester	Address
Ascutney	1919	20	344	Walter Hatch	Hartland
Cabot	1915	28	545	Emmons Sargent	Stowe
Champlain Valley	1913	27	564	Harold Freer	So. Ryegate
Craftsbury	1911	22	426	Harry McLean	Montpelier
E. Caledonia	1912	27	432	C. N. Howe	W. Danville
Enosburg	1910	24	565	S. A. Chandler	Marshfield
Enosburg-Montgomery	1920	23	500	H. W. Walker	Cabot
Grand Isle County	1920	29	410	Lawrence Smith	Chelsea
Ira-Tinmouth- Middletown	1910	25	465	Geo. H. Leonard	Simonsville
No. Chittenden	1910	24	510	Clayton Brown	Wrightsville
No. White River	1919	22	416	W. E. Hyzer	Randolph
Randolph	1910	25	501	Walter Wheatley	Randolph Ctr.
Rutland	1910	21	714	W. D. Walden	Pittsford
St. Albans	1910	21	522	M. C. Riley	Stowe
Washington Co.	1918	24	427	E. M. Maxham	Worcester
Waterbury-Waitsfield	1910	24	495	K. R. Manning	Colchester
White River	1908	20	431	W. S. Parsons	Quechee
White Rock	1919	24	462	Clarence Wheeler	Cabot
Total		430	8729		

DEPARTMENT OF AGRICULTURE.

Financial Statement Biennial Period Ending June 30, 1920.

DISBURSEMENTS.

	1919	1920
Commissioner of Agriculture:		
Salary,	\$ 3,000.00	\$ 3,000.00
Travel,	275.91	637.43
Hotel,	339.99	693.50
Office Expenses:		
Rent, Lights, Janitor,	269.20	
Furniture and office supplies,	1,014.51	1,240.69
Postage, Telephone, Telegraph,	1,737.53	867.90
Stationery and printing,	977.78	384.71
Freight, express, cartage,	369.09	96.68
Instruments, tools, etc.,	60.00	118.12
Clerical Force,	2,730.82	2,960.00
Dairy Manufacturing Specialist:		
Expenses only,	\$1,569.11	
June expenses paid after		
July 1, 1920,	92.31	
	<u>1,295.30</u>	1,476.80
Creamery and Cheese Factory Inspectors:		
	1919	1920
Salaries,	\$4,195.27	\$4,025.77
Expenses,	3,657.31	3,872.45
	<u>\$7,852.58</u>	<u>\$7,898.22</u>
June accounts paid after		
July 1, 1920,	526.05	
	<u>7,852.58</u>	7,372.17
	\$7,852.58	\$7,372.17
Supervisor Cow Test Associations:		
	1919	1920
Salary,	\$ 707.90	\$ 600.00
Expenses,	1,193.49	1,192.44
	<u>\$1,901.39</u>	<u>\$1,792.44</u>
June accounts paid after		
July 1, 1920,	160.17	
	<u>1,901.39</u>	1,632.27

Apiary Inspectors:

	1919	1920		
Salaries,	\$ 106.00	\$ 354.00		
Expenses,	102.98	460.97		
	<u>\$ 208.98</u>	<u>\$ 814.97</u>		
June accounts paid after July 1, 1920,		9.25		
		<u>\$ 805.72</u>	208.98	805.72

Nursery inspector:

	1919	1920		
Salary,	\$ 42.00	\$ 126.70		
Expenses,	53.84	133.58		
	<u>\$ 95.84</u>	<u>\$ 260.28</u>		
June account paid after July 1, 1920,		12.18		
			95.84	248.10

Farm Labor and Sales Agent:

	1919	1920		
Salary,	\$ 975.00	\$ 385.00		
Expenses,	116.13	217.66		
	<u>\$1,091.13</u>	<u>\$ 602.66</u>		
June account paid after July 1, 1920,		36.28		
			1,091.13	566.38

Field Agent in Marketing:

	1919	1920		
Salary,	\$1,399.92	\$ 877.70		
Expenses,	1,208.02	1,501.38		
	<u>2,607.94</u>	<u>2,379.08</u>		

Agricultural Education:

Springfield Exhibit (\$686.90 re- funded State Treasurer),		1,686.90
Corn Borer Plates,	105.00	
Institute Speakers,	422.93	446.50
Lantern Slides,		57.61

Plant Pathologist:

Salary, \$1,000.00

Expenses, 461.57

\$1,461.57

June accounts -paid after

July 1, 1920, 83.34

Special Assistance,

1,378.23

Insurance,

49.05 6.00

Miscellaneous,

19.62 3.66

Census of Farms for Sale,

108.40 53.01

Transfer to Live Stock Account,

2,181.34

1,500.00

Total Disbursements,

\$28,032.99 \$30,292.80

DEPARTMENT OF AGRICULTURE.

Financial Statement Biennial Period Ending June 30, 1920.

RECEIPTS.

	1919	1920
Appropriation,	\$29,876.00	\$29,600.00

Unadjusted credit, 1.90

Receipts:

Refund, Springfield Exhibit, 686.90

Refund, Testers' License Fees, 4.00

Total Receipts,

\$29,876.00 \$30,292.80

Total Disbursements, Agriculture,

28,032.99 30,292.80

Unexpended balance,

\$ 1,843.01

DEPARTMENT OF AGRICULTURE.

Financial Statement Biennial Period Ending June 30, 1920.

CENSUS OF FARMS FOR SALE.

1920

Obtaining statistical information and visiting

farms to check data given in questionnaires, \$1,100.03

Publication and Distribution of Book:

Editor, salary, \$560.00, travel, \$51.29,	611.29
Clerical assistance,	307.75
Paper for book,	706.90
Printing, envelopes, etc.,	1,904.13
Advertising,	716.38
Postage, etc.,	334.86

Total Disbursements,	<u>\$5,681.34</u>
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Receipts:

Appropriation (Sec. 8, No. 15, Acts of 1919),	\$3,500.00
Expended from Agricultural Appropriation,	2,181.34
Total Receipts,	<u>\$5,681.34</u>

DEPARTMENT OF AGRICULTURE.

Financial Statement Biennial Period Ending June 30, 1920.

BLISTER RUST AND SUPPRESSION OF INSECTS.

	1919	1920		
Appropriation,			\$10,000.00	\$9,400.00
Disbursements:				
	1919	1920		
Blister Rust,	\$2,872.30	\$4,828.59		
Insect Work,	1,265.57	4,561.34		
	<u> </u>	<u> </u>	4,137.87	9,389.93
Unexpended balance,			\$ 5,862.13	\$ 10.07

REPORT OF THE LIVE STOCK COMMISSIONER.

E. S. BRIGHAM.

The duties of the live stock commissioner, as outlined in my previous report, may be classified as follows:—

1. Regulation of live stock imports so that the live stock of the state may not be infected by the importation of diseased animals.
2. The control of outbreaks of contagious diseases which are dangerous to live stock.
3. The eradication of tuberculosis from the herds of the state, the supervision of tuberculin tests of cattle made for shipment out of the state and the inspection of animals slaughtered for food.

I beg leave to discuss the work of the office under the above headings, and to make some suggestions for the future.

1. REGULATION OF LIVE STOCK IMPORTS.

The Legislature made some important changes in the laws relating to the importation of live stock. The requirements for the importation of horses and mules were made uniform with those for the importation of cattle, and the commissioner was given authority to require a sixty-day retest of cattle admitted to Vermont upon certificate of tuberculin test made in another state. The table on the opposite page shows the number of cattle, horses and mules imported into the state and the precautions taken to prevent the introduction of disease.

RECORD OF CATTLE AND HORSES IMPORTED INTO VERMONT—JULY 1, 1918, to JUNE 30, 1920.

	New Hampshire	Massachusetts	Connecticut	Maine	Rhode Island	New York	New Jersey	Canada	Pennsylvania	Illinois	Minnesota	Missouri	Ohio	Other states	Totals 1920	Totals 1919
CATTLE*																
Held for 60-day retest:—																
Tested and passed	259	146	11	64	5	176	11	48	2					42	764	1167
Tested and condemned	29	10		1	1	16	4	2	1						64	5
Died, killed or reshipped before test	9	5	1	3		16	1	1						1	37	
From accredited herds—not held for test	4	1												2	7	
Imported for immediate slaughter	32			1		5		34							72	63
Imported for immediate reshipment	133	1				108									242	305
Imported for exhibition—breeding	55	47	26	3		29		12							172	42
Imported for public sale and re-shipped	68	31	7	11	2	37									156	400
Vt. cattle returning—no test	59	46													105	
Total cattle	648	287	45	83	8	387	16	97	3					45	1,619	1982

RECORD OF CATTLE AND HORSES IMPORTED INTO VERMONT—JULY 1, 1918, to JUNE 30, 1920.—Con.

	New Hampshire	Massachusetts	Connecticut	Maine	Rhode Island	New York	New Jersey	Canada	Pennsylvania	Illinois	Minnesota	Missouri	Ohio	Other states	Totals 1920	Totals 1919
HORSES																
Mallein tested	8	366	5	4		297		18	1	39		20	15	97	870	1348
Physically examined	403	231	12	1	1	155		441		594	37	149	88	45	2,157	2408
For exhibition	4		2			21									27	
Vermont horses returning			2												2	
Old horses for slaughter	16														16	
For short stay—reshipped	6	5				1									12	6
Total horses	437	602	21	5	1	474		469	1	633	37	169	103	142	3,084	3762

—*Regulation requiring cattle to be held in quarantine at destination and tested after 60 days went into effect May 1st, 1919. Previous to that time cattle were released on receipt of satisfactory certificates showing test in state of origin.

SIXTY-DAY RETEST.

So many cases came to our notice of the failure of tuberculin tests made in other states to adequately protect our farmers against the importation of tubercular animals, that the following order was issued, effective May 1, 1919:—

“All cattle imported, except for purposes of exhibition, public sale, pasturage, immediate reshipment or immediate slaughter, and except as provided in Section 5, (relating to accredited herds) shall be held in quarantine for an official tuberculin test to be applied, at the expense of the owner, by an approved veterinarian, under the direction of the commissioner of agriculture, not less than 60 days after arrival of cattle in Vermont.”

The following table shows the number of cattle imported by months from the date the order went into effect until April 30, 1920, to which date retests have been completed up to July 1, 1920:—

RECORD BY MONTHS OF CATTLE IMPORTED SUBJECT TO SIXTY-DAY RETEST.

(Sixty-day Retest Regulation went into effect May 1, 1919.)

Month Imported	Number Retested.	Number Passed.	Number Cond'm	Percent Cond'm
May 1919,	83	79	4	4.8
June 1919,	108	93	15	13.8
July 1919,	58	58	..	
August 1919,	141	137	4	2.8
September 1919,	48	38	10	20.0
October 1919,	97	89	8	8.2
November 1919,	86	73	13	15.0
December 1919,	46	45	1	2.1
January 1920,	38	35	3	7.8
February 1920,	28	24	4	14.0
March 1920,	33	33	..	
April 1920,	69	67	2	2.9
Totals,	835	771	64	7.6

This table shows that in one year the retest order prevented the introduction of 64 tubercular cattle and saved the State from ultimately paying for these as reactors and for a larger number of cattle which might be infected by

them. Vermont farmers for the most part import breeding cattle of high quality to improve their herds, and it is important for us to use every precaution to prevent the importation of diseased animals which will be a menace to the herds into which they are taken.

CHANGES RECOMMENDED.

The amendments to the laws regulating the importation of live stock made by the legislature now give the commissioner of live stock adequate power to safeguard the state against the importation of diseased animals. It requires simply a rigid enforcement of these laws as they now stand to provide adequate protection to our live stock interests. Any State which does not maintain careful safeguards is made the dumping ground by dealers from other states for diseased cattle and horses. Therefore, it is necessary that we retain our present laws and that we see that they are strictly enforced. In the fall of 1919 and the spring of 1920 we employed an inspector to police the borders of the state to the extent of a total expenditure for per diem and travel of \$500.00. Several prosecutions resulted and I believe a stop has been put to some infringements of the live stock laws. I would recommend that an inspector be employed for at least six months each year in order to more adequately police the borders of the State. This will require the expenditure of perhaps \$1,500 annually, but a sum greater than this will be saved in the end. It might also assist in securing evidence against live stock runners if a portion of the fine charged against convicted offenders be given to persons furnishing the evidence which leads to conviction.

2. CONTROL OF OUTBREAKS OF DANGEROUS CONTAGIOUS DISEASES.

ANTHRAX:—An outbreak of anthrax occurred in the town of Cambridge in the fall of 1919 resulting in the death of several cattle. The infected premises were quarantined and the remaining cattle in the herds promptly vaccinated.

Anthrax is an infectious disease, fatal to man and animals, and the germs which cause it will remain in the soil for a long period of years. These germs may also be conveyed to lower lying farms along a stream by flood waters. It is, therefore, necessary that prompt measures be taken to quickly check any outbreak which may occur

and to follow up cases and guard against a recurrence. We have followed the policy of furnishing vaccine to owners of herds where outbreaks occur or have occurred in the past and the owners have paid for veterinary service in connection with the vaccination.

HEMORRHAGIC SEPTICEMIA:—Reports of outbreaks of this disease come from all parts of the state. Particularly severe was the outbreak in Chittenden County in the fall of 1918, which resulted in the death of 38 cattle. This is an infectious disease, but it does not spread readily from farm to farm. Local veterinarians are now promptly vaccinating herds in which outbreaks occur, with hemorrhagic septicemia serum, with apparently excellent results in stopping the spread of the disease. The treatment and vaccine are both paid for by the owner.

BLACKLEG:—Outbreaks of blackleg occur periodically on many farms where this disease has become established. Since this disease is not readily spread we do not quarantine infected premises, but we have been able to supply owners of infected premises with vaccine with which to vaccinate their young stock, from a supply which has been furnished us by the U. S. Bureau of Animal Industry.

HOG CHOLERA:—Outbreaks of hog cholera have occurred in different parts of the State. We have quarantined infected premises to prevent spread and have recommended to owners of hogs on infected premises and on premises which have been exposed to infection to vaccinate their hogs with hog cholera serum. We have purchased serum and sold it at cost to owners of hogs who were willing to pay the expense of serum treatment.

GLANDERS:—It is very gratifying to report that during the two-year period but three horses have been condemned as having glanders and destroyed. During the period of eight years from 1910 to 1918 an average of 17 horses annually were condemned. The decrease shows that more rigid control of importations is proving effective in keeping out this disease.

SCABIES:—In the late winter and in the spring of 1919 there occurred in Washington County an outbreak of a serious skin disease known as scabies. It was thought at first that this outbreak was limited to a few farms and that quarantine measures together with treatment with crude oil might enable us to exterminate the disease from the State. Investigation, however, showed that the disease was sufficiently widespread, not only in Washington County, but also in other parts of the State, so that it was impossible

to completely eradicate the disease with any reasonable expenditure of funds. Therefore, no further resort to quarantine measures was had, but full information was given to practicing veterinarians and to owners as to how the disease could be treated. The treatment with crude oil is not expensive and is very effective in stamping out the disease.

VETERINARY PATHOLOGIST NEEDED.

In dealing with outbreaks of contagious diseases of live stock it is often necessary to have a pathological examination of tissues in order that a correct diagnosis of the disease may be made. The State Laboratory of Hygiene has done everything in its power to assist in doing this work but the demand now exceeds the ability of that institution to properly take care of it. I would recommend that an appropriation be made for the employment of a veterinary pathologist to be located at the Laboratory of Hygiene, so that we would have at our command the necessary pathological service to enable us to deal promptly and effectively with outbreaks of live stock diseases.

3. ERADICATION OF BOVINE TUBERCULOSIS.

As outlined in a previous report, the work done in eradicating tuberculosis may be divided into four classes:—

1st. Private tests made by veterinarians working under the authority of the Commissioner of Agriculture and paid for by the owner.

2d. Tests of cattle for shipment out of the State, which are made in the same way and also paid for by the owner or the shipper.

3d. Tests made by the State and Federal governments, which, during the past fiscal years, have been made by veterinarians employed on full time by the State or Federal governments.

4th. The examination of animals slaughtered for human consumption and suspected of having tuberculosis.

The following table shows the number of tests and examinations which were made under the above classifica-

tions, with a summary for the same, and the number of slaughtered animals examined:—

CATTLE REPORTED TESTED AT PRIVATE TESTS: CATTLE REMAINING IN THE STATE:

	1919	1920	
Pure-bred cattle tested,		1,592	
Grade cattle tested,		5,295	
Number cattle tested,	3,446	6,887	
Pure-bred cattle condemned,		249	
Percentage of pure-breds condemned,			15.5
Grade cattle condemned,		693	
Percentage of grades condemned,			13.0
Cattle condemned and held in quarantine under Sec. 505,	2	27	
Number cattle condemned,	457	969	
Percentage condemned,			14.0
Cattle classed as suspicious, killed and found diseased,		12	
Cattle classed as suspicious, killed and no lesions found,		2	
Per cent showing lesions,			85.

CATTLE REPORTED TESTED AT PRIVATE TESTS. TESTED FOR SHIPMENT OUT OF VERMONT.

Pure-bred cattle tested,		647	
Grade cattle tested,		8,341	
Total number cattle tested for shipment,	4,346	8,988	
Pure-bred cattle condemned,		20	
Percentage of pure-breds condemned,			3.
Grade cattle condemned,		275	
Percentage of grades condemned,			3.29
Number of cattle condemned at shippers' tests,	105	295	
Percentage condemned,			3.28
Cattle classed as "suspicious", killed and found diseased,		10	
Cattle classed as "suspicious", killed and no lesions found,		None	
Percentage showing lesions,			100

SUMMARY OF PRIVATE TESTS.

Pure-bred cattle tested,		2,239	
Grade cattle tested,		13,636	
Total number cattle tested at private tests,	7,792	15,875	
Per cent increase,			103
Pure-bred cattle condemned,		269	

Grade cattle condemned,		968	
Condemned and held in quarantine under Sec. 505,	2	27	
Total number of cattle condemned at pri- vate tests,	562	1,264	
Percent of cattle condemned at private tests,	7.2		7.9
Percent increase,			124

CATTLE TESTED UNDER AGREE- MENT.

(Sec. 500 (as amended by Sec. 4, No. 18,
Acts of 1919.))

State and Federal Cooperative Tests.

Number of lots or herds tested,		2,051	
Pure-bred cattle tested,		9,769	
Grade cattle tested,		26,972	
Total number cattle tested under agree- ment,	14,384	36,741	
Pure-bred cattle condemned,	286	767	
Percentage of pure-breds condemned,			7.8
Grade cattle condemned,	940	2,273	
Percentage of grades condemned,			8.4
Cattle condemned and held in quarantine under Sec. 505,	68	13	
Total number cattle condemned at co- operative tests,	1,294	3,053	
Percentage condemned,	8.9		8.3
Cattle classed as "suspicious", killed and found diseased,		120	
Cattle classed as "suspicious", killed and no lesions found,		3	
Total number suspects killed,		123	
Percentage showing lesions,			97

SUMMARY OF ALL CATTLE TESTED.

Cattle tested at cooperative tests,	14,384	36,741	
Cattle tested at private tests,	7,792	15,875	
Total number cattle tested,	22,176	52,616	
Percent increase,			137
Cattle condemned at cooperative tests,	1,294	3,053	8.3%
Cattle condemned at private tests,	562	1,264	7.9%
Total number cattle condemned,	1,856	4,317	
Percent increase,			132

GRAND TOTAL.

Cattle tested in Vermont for two years ending June 30, 1920,	74,792 head
Total condemned,	6,173 head
Percent condemned,	8.2%

VERMONT HORSES.

Physically examined and passed,	19 head
Mallein tested and passed,	17 head
Mallein tested, condemned and killed,	2 head

ANIMALS SLAUGHTERED FOR HUMAN CONSUMPTION AND FOUND TUBERCULOUS.

1918-1919,	212 cattle, 87,275 lbs.	14 hogs, 2,320 lbs.
1919-1920,	296 cattle, 119,291½ lbs.	7 hogs, 1,367 lbs.

The following is the financial statement covering the receipts and expenditures of the live stock department during the biennial period:—

LIVE STOCK DEPARTMENT.

Financial Statement July 1, 1918, to June 30, 1920.

Disbursements.		1919	1920
Claims paid for:—			
Cattle condemned and destroyed:—			
Cooperative tests—State proportion, 1919,			
1,711 head; 1920, 2,563 head,	\$ 77,587.00	\$123,680.32	
Private tests, entire indemnity paid by			
state, 1920, 171 head,		12,228.75	
Total paid by State for cattle tested and killed,	\$ 77,587.00	\$135,909.07	

ANIMALS SLAUGHTERED FOR HUMAN CONSUMPTION AND FOUND TUBERCULOUS.

	1919	
212 cattle, 87,275 lbs.; 14 hogs, 2,320 lbs.,	\$ 6,661.85	
	1920	
296 cattle, 119,291½ lbs.; 7 hogs, 1,367 lbs.,		\$ 10,277.23

VERMONT MILCH COWS CONDEMNED IN MASSACHUSETTS.

1919	1920		
64 head,	1 head,	988.36	36.38

HORSES CONDEMNED AND DESTROYED.

1919	1920		
1	2	18.75	206.25
Salvage received and paid owners for reactors			
at private tests,			2,279.66
Salvage received and paid owners on suspects			
killed and found not diseased,			161.75
Total claims,		\$ 85,255.96	\$148,870.34

		1919	1920
State Veterinarians:			
	1919	1920	
Salaries,	\$3,005.56	\$7,916.14	
Expenses,	830.45	1,694.31	
		\$ 3,836.01	\$ 9,610.45

(Two veterinarians in 1919, five in 1920.)

Miscellaneous Veterinary Services:

Examination of animals killed for human consumption and found tuberculous,			
	1919	1920	
		1,008.24	1,999.22

Department Expenses:

Deputy Live Stock Commissioner salary and expenses,	\$1,496.97	\$1,428.31	
Clerical,	651.13	1,244.19	
Postage, telephone, telegraph,	105.28	516.05	
Freight and express, cartage,	3.04	4.09	
Tuberculin, mallein, vaccine, etc.,	84.10	*973.24	
Printing, stationery,	170.00	394.66	
Thermometers, tags, etc.,	402.47	947.07	
Office supplies,		2.55	
Miscellaneous,	38.00	75.48	
		2,950.99	5,585.64
Gross expense,		\$ 93,051.20	\$166,065.65

RECEIPTS.

Sale of hides and carcasses,	\$ 31,580.88	\$ 65,953.21
Sale of ear tags and thermometers,	2.40	14.78
Sale of Anti-Hog Cholera Serum,		21.00
Refund on telegram,		.45
State Board of Health, (Three reactors to be used for experimental purposes),		70.00
Transfer from Agricultural Appropriation,	1,500.00	
Total receipts,	\$ 33,083.28	\$ 66,059.44

SUMMARY.

	1919	1920
Gross Expense as above,	\$ 93,051.20	\$166,065.65
Total Receipts,	33,083.28	66,059.44
Net Cost,	\$ 59,967.92	\$100,006.21

(*U. S. Bureau of Animal Industry furnished free of charge most of the tuberculin used in 1919.)

APPROPRIATIONS.

	1919	\$ 65,000.00
Net Cost, 1919, ,	\$59,967.92	
Plus claims paid after July 1, 1919,	1,459.13	
	<u>61,427.05</u>	
Balance of Receipts Available July 1, 1919,	3,572.95	
1920		\$100,000.00
Balance Receipts 1919,		<u>3,572.95</u>
		\$103,572.95
Less Net Cost, 1920,		<u>100,006.21</u>
Balance of Receipts Available July 1, 1920,		\$ 3,566.74

CHANGES IN POLICY MADE BY LEGISLATURE OF 1919.

The legislature of 1919 made some very important changes in the laws relating to tuberculin testing. The principal changes in policy may be outlined as follows:—

1. The commissioner was given authority to require as a condition of making a tuberculin test at the expense of the State the observance on the part of the owner of such measures as are deemed necessary to keep the herd free from tuberculosis.

2. The payment of indemnity for cattle condemned as tuberculous as a result of private test was made conditional upon the submission by the owner of his entire herd or herds to the State test under the rules above referred to, if the animal had been in the possession of such owner for ninety days. If the animal had been purchased within ninety days, all persons who had owned it within ninety days of the test must admit their entire herd or herds for State test before indemnity could be paid.

These changes were adopted upon the theory that the State is appropriating money to deal with the tuberculosis problem for the purpose of eradicating the disease, that the payment for an occasional animal condemned as the result of a test of a few animals in a herd was simply insurance and did nothing toward eradicating the disease, that the State should help the owner but the owner should also enter into partnership with the State to produce and maintain a clean herd of cattle, which can only be accomplished by frequent and continued tests of the entire herd and by the isolation of the herd so that it will not be subject to infection from diseased animals.

The rules prescribed by the commissioner as a condition of granting a State test have been those adopted by the U. S. Bureau of Animal Industry and the U. S. Live Stock Sanitary Association as necessary to follow if a clean herd is to be produced and maintained, and a herd owner agrees in writing to follow these rules before a test is given.

COOPERATION WITH THE U. S. BUREAU OF ANIMAL INDUSTRY.

The U. S. Bureau of Animal Industry has continued upon a greatly enlarged scale through the biennial period the cooperative work begun in July, 1917.

The Bureau on June 30, 1920, is giving Vermont the following assistance:—

1. Paying one-half the salary and expenses of the inspector in charge.
2. Paying the salaries and expenses of five veterinarians to make tuberculin tests.
3. Furnishing a stenographer and a clerk.
4. Supplying nearly all the tuberculin and ear tags used in our work.
5. Providing two inspectors to supervise the cleaning and disinfection of premises after reacting animals are removed.
6. Paying toward the indemnity for animals which react to the tuberculin test made under agreement, one-third the difference between the appraised value of such reactors and the amount received from salvage.

Dr. A. J. DeFosset has acted as inspector in charge during the biennial period.

The following table shows the expenditures made by the U. S. Bureau of Animal Industry in Vermont since July 1, 1918, not including tuberculin and tags, and the cost of veterinary service and indemnity to the State to meet the requirements of the cooperative agreement.

EXPENDITURE BY U. S. BUREAU OF ANIMAL INDUSTRY IN VERMONT.

	1919	1920
Indemnity:		
Paid July 1, 1919, to June 30, 1920, 2,713 head,		\$ 69,880.33
Paid after July 1, 1920, 63 head,		2,129.77
Outstanding, 30¢ head,		9,109.32
Total indemnity,	\$ 15,520.40	\$ 81,119.42
Bureau veterinarians,	4,246.71	10,503.51
Lay Inspectors,	2,669.19	3,941.70
Station expenses,	3,237.53	3,639.49
Total,	\$ 25,673.83	\$ 99,204.12
Cost of Testing:	1919	1920
Bureau veterinarians,	\$4,246.71	\$10,503.51
State veterinarians,	3,836.01	9,610.45
	\$ 8,082.72	\$ 20,113.96
Average cost of testing per herd,	13.81	9.80
Average cost of testing per animal,	.56	.54
Cost of Disinfection: (Federal),	2,669.19	3,941.70
Approximate cost of disinfecting each premise,	4.56	5.25
Average indemnity paid 1920:		
State,		49.66
Bureau,		25.75
Average indemnity per animal,		\$ 75.41

SUMMARY OF EXPENDITURES.

	1919	1920
Bureau,	\$ 25,673.83	\$ 99,204.12
State,	93,051.20	166,065.65
Grand total expended for Tuberculosis Eradication in Vermont,	\$118,725.03	\$265,269.77

DEMAND FOR TUBERCULIN TESTS.

In July, 1919, a bulletin was issued explanatory of the new law and outlining what the State and Federal governments would do for Vermont live stock owners in the way of assistance in freeing herds from tuberculosis and what owners would be expected to do in the future care of their herds. Posters giving a summary of these conditions were also prepared and placed in conspicuous places about the State. There resulted a flood of applications for tuberculin tests, which far exceeded our ability to take care of with the annual appropriation of \$100,000 made available for the biennial term by the legislature of 1919.

From July 1, 1919, to November 16, 1919, we had tested 8,000 head of cattle, and on the latter date we had on hand applications for testing 16,000 head. According to our estimates the testing of this number of cattle would exhaust our appropriation for the year ending June 30, 1920, provided a normal number of reactors was found. From November 16th onward, applications for tuberculin tests were accepted subject to our having money available to pay claims.

It seemed best, however, to continue testing as rapidly as our force could do the work, with the understanding that after the appropriation for the year ending June 30, 1920, was exhausted, claims for indemnity could not be paid until after July 1, 1920. This seemed the best policy because the U. S. Bureau of Animal Industry was prepared to meet any reasonable demand from its 1920 appropriation but the 1921 appropriation was somewhat reduced.

On March 5, 1920, we had on hand applications for testing 796 herds, including 12,439 cattle. According to our estimates, with a normal number of reactors, the completion of this business together with what had been previously done, would exhaust our appropriation for the fiscal year ending June 30, 1921. Beyond this date the legislature of 1919 made no provision and since we had no right to involve the State for any sums which had not been appropriated, we accepted applications from March 5, 1920, onward with the understanding that the work would be done provided funds were available when the applicant's turn should be reached.

Futhermore, under the law an owner may have a private test of his herd by an approved veterinarian and if reactors are found the State is obliged to pay the regular indemnity, provided the owner submits his entire herd or herds for a State test, but such indemnity is not paid until the State test is made. Since the large number of applications on hand has made it impossible to make a test for a long time after the date of application, many herd owners have had private tests at their own expense and then submitted their herds for a State test in order to qualify for indemnity, the result being that the State has had to bear the whole of the indemnity because the Federal government will not participate in the payment of such claims.. On March 5, 1920, we notified all approved veterinarians of the financial condition of the live stock department and advised them that they must make it plain to herd owners employing them to make private tests that State indemnity

for reactors could not be paid until the herd had been submitted for State test and such test completed; that it was probable that from this time on before the turn of the herd could be reached in order of application, funds appropriated for the live stock department would be exhausted; that we had no right to involve the State beyond the sum appropriated; and that the owner must clearly understand that he must run his own risk of receiving indemnity from funds to be appropriated by the next legislature, but that there was no promise on the part of the live stock commissioner that such indemnity would be paid.

The following table shows the situation on July 1, 1920:
Number herds under State and Federal supervision, 1,974
Number of cattle:

	8,515 purebreds,	
	25,757 grades,	
	34,272	34,272
Number of herds on waiting list,		910
Number of cattle,		11,929
Number of herds accredited,		66
Number of cattle accredited:		
	958 pure-breds,	
	832 grades,	
	1,790	1,790
Number of herds once tested without reactors,		1,343
Number of cattle once tested without reactors:		
	3,637 pure-breds,	
	12,395 grades,	
	16,032	16,032

The following table shows our estimates of the financial condition of the live stock department for the fiscal year ending June 30, 1921, on the basis of applications for tests on hand July 1, 1920:

ESTIMATES FOR FISCAL YEAR ENDING JUNE 30, 1921.

Disbursements.

Outstanding claims for cattle condemned at co-	
operative tests prior to June 30, 1920,	\$ 32,072.42
Outstanding claims for cattle condemned at pri-	
ivate tests,	48,101.21

Beef claims, (estimated),	10,000.00
Department expenses, (estimated),	20,000.00
Applications on hand for testing 11,928 head cattle; estimated 9% will be condemned:	
1,073 head at average indemnity of \$48.20,	51,718.60
Total,	\$161,892.23

Receipts.

Appropriation for 1920-1921,	\$100,000.00
Balance receipts 1920,	3,566.74
Due from rendering company,	1,326.57
1,073 head at average net salvage of \$16.75,	17,972.75
Total,	\$122,866.06
Estimated disbursements,	161,892.23
Estimated receipts,	122,866.06
Estimated shortage,	\$ 39,026.17

CHANGES RECOMMENDED.

1. APPROPRIATION.—It will be seen from the above estimates that the appropriation of \$100,000.00 is entirely inadequate to enable the live stock department to meet with any reasonable promptness the demands made upon it for tuberculin testing. If we do no more than test the herds for which applications had been received up to July 1, 1920, we shall, according to our estimates, exceed our appropriation by \$39,000.00 and in these estimates there is no allowance for indemnity for reactors found in retests of herds previously tested. It is our opinion that it will require an appropriation of \$250,000.00 annually to enable the live stock department to test herds for tuberculosis as rapidly as applications are received.

2. DISPOSAL OF REACTORS.—Sec. 506, General Laws, provides that the commissioner may, with the approval of the governor, under certain conditions arrange for the disposal of reactors at a slaughter house *within this State*. On July 1, 1920, the U. S. Bureau of Animal Industry issued rules permitting the interstate shipment for immediate slaughter of cattle reacting to the tuberculin test under Federal Certification. If the limitation of selling these cattle within the State were removed, a wider market could be secured which should insure us a larger return from salvage.

3. GIVING OWNER THE SALVAGE.—In most states the owner of condemned cattle is given the salvage and in addition thereto indemnity from the State. This results in giving to the owner of cattle in good condition, which are not badly diseased, a larger return than is received for badly diseased cattle in poor condition. I would suggest a careful consideration of a change in our indemnity policy. The U. S. government computes its indemnity on the basis of the owner receiving the salvage and sharing in the net loss. The government pays as a cash indemnity one-third the difference between the salvage and the appraised value, with a limit of \$25.00 for each grade animal and \$50.00 for each pure-bred animal. If the State would pay a like amount the owner would receive the salvage and two-thirds the difference between the salvage and the appraised value. The net cost to the State would be about the same as now but the distribution of the money would be more equitable.

REPORT OF STATE FORESTER.

E. S. BRIGHAM.

The work of the forestry department for the biennial period is covered in detail by the report of Chief Forester W. G. Hastings, which follows.

It has been the general policy of the department during these years of high labor cost to do a minimum of development work on State lands and to invest any savings which would be made in the operation of the department in new lands which could be developed later when conditions are more favorable. The balance of the appropriation for the fiscal year beginning July 1, 1917, was invested in the Groton forest, which is described on page 117 of the chief forester's report.

The same plan was carried out in the operation of the department for the fiscal year beginning July 1, 1918. When it became apparent in the spring of 1919 that there would be a substantial balance left from the appropriation for agriculture and forestry, an option was secured on a tract of land adjoining the Groton forest, which could be bought on advantageous terms. On May 29, 1919, a letter was addressed to the board of control asking authorization to use the balance of the agricultural and forestry funds in the purchase of forest lands as provided for in Section 466 of the General Laws.

Under date of June 28, 1919, the following reply was received:—

“Referring to your letter of May 29, 1919.
Authority is denied by the Board of Control for
the purchase of forest lands.”

The legislature of 1912 made an appropriation of \$7,500 for the purchase of forest lands and for the reforestation of such portions of the same as are suitable for such purpose. This appropriation was continued by each succeeding legislature until it was abolished by the legislature of 1919, thereby leaving the department without special funds for the purchase and development of lands for state forests.

The department has, therefore, been forced to take a distinctly backward step in forest development during the

biennial period, through the action of the board of control in preventing the use of funds appropriated for the department and by the action of the legislature in withholding the accustomed support.

According to the estimates made by Chief Forester Hastings, approximately 4,000,000 acres, or two-thirds of the total area of Vermont, is in woodland. It is of great importance to the people of the state that this area be so handled that it will yield a crop of timber. The main reasons for this may be summarized as follows:—

I. The prosperity of our wood working industries, upon which a number of our citizens are dependent for their living, depends upon a constant supply of raw material in the form of timber.

II. A supply of material for buildings for our towns and for our farms sufficient to meet future needs is imperative if Vermont is to have a normal development.

III. Our denuded hill sides permit in heavy rain storms a rapid runoff of water into our streams, producing floods which alternate with periods of low water during drought. This will interfere with the development of our hydro-electric resources because of the fluctuation in amounts of light and power which can be furnished.

IV. The present scarcity and high price of coal suggest the wisdom of making provision for a supply of wood for fuel in the future.

V. Vermont cannot be true to its name of "the Green Mountain State" and retain its reputation for scenic beauty if its hillsides are denuded of growing trees.

There are two ways in which the cut over lands of the state may be reforested:—

1. Private owners may be encouraged to plant. This policy has been followed by the department since its inception and trees have been furnished to private planters at cost of growing. This policy should be continued and an educational campaign should be carried on to encourage every farmer to plant for sufficient forest development on his property to enable him to replace his farm buildings if they should be destroyed by fire.

2. The forest area of the state may be developed in a system of state forests purchased by the state and developed according to the best scientific forestry practices.

According to the estimates made by the chief forester land can be purchased from private owners, outplanted with trees, protection against fire furnished, and a crop of 30,000 feet harvested in 70 years. He says:

"Assuming an initial cost of \$5.00 per acre for raw land, \$15.00 an acre for the establishment of a satisfactory stand of forest reproduction, and assuming that 25c per acre per year will cover the cost of care, taxes and improvements, then the total cost of bringing a forest to maturity—say 70 years—at 4% compound interest is:—

\$5.00 land cost at 4% compound interest for 70 years,	\$ 77.85
\$15.00 reproduction cost at 4% compound interest for 70 years,	233.55
25c running cost at 4% compound interest for 70 years,	92.07
Total cost per acre at end of rotation,	\$ 403.47
Expected yield at end of rotation 30,000 feet.	
Present day average value of stumpage \$10.00.	
Probable future value of stumpage \$20.00.	
Probable value of crop at end of rotation,	600.00
	<u>\$ 196.53"</u>

If the state can make an investment in forest lands and receive back in from fifty to one hundred years the cost of the land and its development, together with 4% interest upon its investment, I believe it will be good policy and that the profit which will come to the state in providing a supply of timber for the future, in conserving moisture for the protection of our water power and the addition to our scenic beauty, will make a splendid return on the investment.

I therefore recommend that an appropriation of \$20,000 per annum be made for the purchase of forest land and the development of such land during the biennial period.

REPORT OF CHIEF FORESTER.**W. G. HASTINGS.**

FACTS ABOUT OUR DISAPPEARING FORESTS.**Why Every Good Citizen Should Support the Movement to
Perpetuate Our Forests.**

Dr. John Ise, an economist formerly on the faculty of Yale University, has written a non-technical book on state and national forest policies and in his preface he makes the following significant statement:—

“The history of the United States is fundamentally a history of rapid exploitation of immensely valuable natural resources. The possession and exploitation of these resources have given most of the distinctive traits to American character, economic development, and even political and social institutions. Whatever preeminence the United States may have among the nations of the world, in industrial activity, efficiency and enterprise, in standards of comfort in living, in wealth and even in such social and educational institutions as are dependent upon great wealth, must be attributed to the possession of these great natural resources; and the maintenance of our preeminence in these respects is dependent upon a wise and economical use of remaining resources.”

The forest is perhaps the most valuable of our generally accepted natural resources in the sense of being both indispensable and serviceable, and in the sense also of being both exhaustible and renewable. Wood in some form or other enters into the daily life of every individual and industry and it will be forever a basic raw material upon which the leading industries of the nation will depend. For general construction purposes, for farming, mining, railroading and for the wood using industries of all sorts, more than 26 billion cubic feet of wood is used or destroyed annually by the people of this country, according to figures reported by the United States Forest Service. The same report declares

the annual consumption per capita to be 300 board feet and places the yearly growth on all the timber lands within the nation at less than one-fourth of our annual consumption. It also shows that the annual per capita consumption of wood in the leading nations of the earth, other than our own, has doubled in the past half century and predicts no reduction in our total annual consumption of wood. The people of the United States found here a bountiful supply of timber—the gift of Nature—and have made wanton waste of this priceless heritage to the extent of virtual exhaustion. The last great forest region—the Pacific Coast—is now full in the swing of such forest devastation as the Southern Pineries, the Northern Pineries and the North Woods previously experienced.

THE LUMBER SITUATION.

“We are consuming lumber three times as fast as we are producing it.

Experts predict our saw log lumber will be gone in fifty years.

The bulk of the original supplies of yellow pine in the South will be gone in ten years and within seven years 3,000 manufacturing plants there will go out of existence.

White pine in the Lake States is nearing exhaustion and these states are paying \$6,000,000 a year in freight bills to import timber.

New England, self-supporting in lumber twenty years ago, now has to import one-third of the amount used. It has \$300,000,000 invested in wood and forest industries, employing over 90,000 wage earners.

Fire destroys over \$20,000,000 worth of timber every year and kills the reproduction upon thousands of acres of forest lands.

Within fifty years our present timber shortage will have become a blighting timber famine (unless sharp corrective measures are immediately adopted).

Forests can be protected from fire, regrowth can be encouraged, conservative cutting can be practiced, reforestation can be accomplished—but it takes from fifty to one hundred years to mature a timber crop.

Forest devastation must be stopped, lands now in forest must be kept continuously productive, forest lands now devastated and idle must be put to work.”

**HELP
PROTECT
THE
GREEN MT. FORESTS
AGAINST
FIRE**

A FEW MONTHS
To Rebuild a
CITY
A LIFETIME
To Grow a
FOREST

**PUT OUT
YOUR
CAMPFIRE**
WITH WATER
THEN COVER IT WITH
EARTH

WANTED
FOR
ARSON
ANY
CAMPER
Who Leaves Any
FIRES BURNING

\$100,000,000.00
LOST
IN
ONE FOREST FIRE

WANTED
Campers who Leave
**NO
FIRES
BURNING**

DON'T
THROW AWAY
BURNING
MATCHES—TOBACCO

EVERYBODY
LOSES
WHEN
TIMBER BURNS

CAUTION!
MAKE
**CAMPFIRES
SMALL**
AND IN
SAFE PLACES

PULPWOOD AND PAPER SITUATION.

"Ten years ago the United States produced its entire supply of pulpwood but now two-thirds of it is imported. This means freight rates to be added to the purchase price.

Indications are that supplies of pulpwood timber in New England and New York will be exhausted in twenty years.

In New York alone supplies will be gone in ten years.

Dependence upon foreign supplies of pulpwood for news print means we will be at the mercy of foreign manufacturers as to prices.

Ten years ago the United States produced its entire news print supply—now we import two-thirds of it.

Only one-third of the newspapers issued in 1919 were printed on the product of American forests.

High cost of pulp and paper mills prevents the manufacturing plants from following the timbers as do saw mills.

Much pulpwood has now to be freighted 500 miles to the mills.

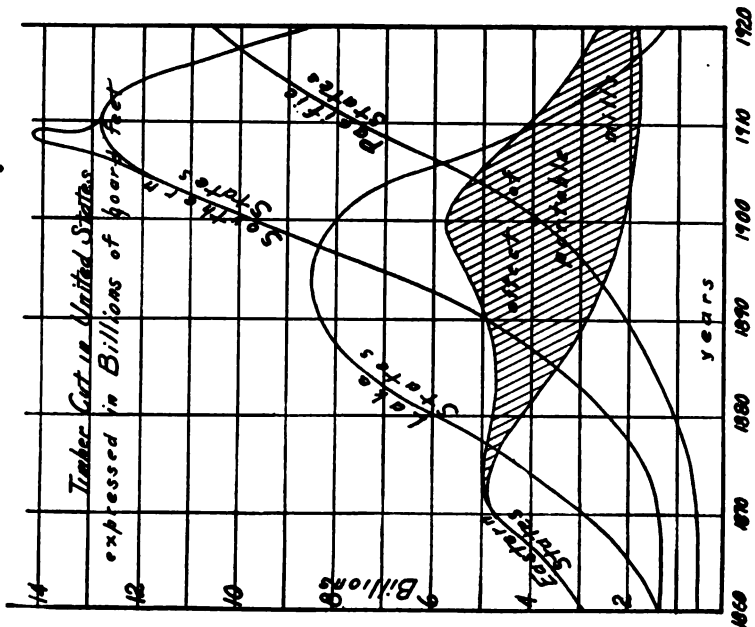
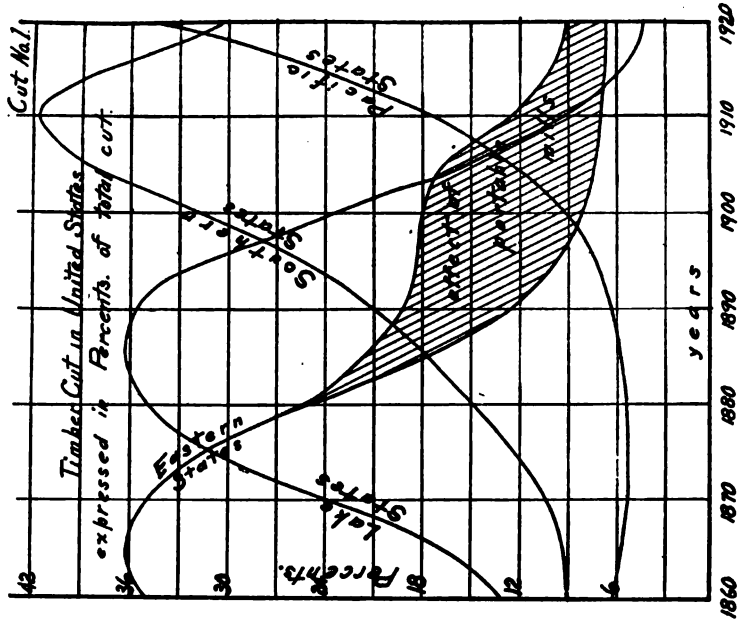
We bought nearly 1,400,000 tons of pulpwood from Canada in 1918 and prices advanced from \$10 a cord to as high as \$25.00."

THE TIMBER SITUATION.

Timber depletion:—Sixty years ago New England was the center of the lumber industry of America; later New York held the palm for a brief period; then Pennsylvania for a score of years was the lumber center, passing its hey-day about 1870; the Lake States with Michigan as the center of things began their career as the lumber producing center of America at the time the cut in Pennsylvania began to wane and reached their height of production twenty years before they were forced to give up their preeminence to the South. It has taken the lumber jack and the mill man about twenty-five years to cut out enough of the southern pineries to put the end of the supply of saw material of that timber region in sight. Already the state of Washington is the leader in lumber production and shortly the Pacific Coast forest region—the last one on the North American continent available to the people of the United States for large amounts of soft wood timber in large sizes—will become the center of lumber production in America.

The change in the location of the center of production from North to South in the nineties meant a change from soft pine to hard pine and gave the general public its first shock concerning the possibility of timber exhaustion. Previously, the successive migratory movements of the lumber industry from New England to New York, from New York to Pennsylvania, and from there in turn to Michigan, Wisconsin and Minnesota, meant simply the wrecking of a thousand mills or so, in a depleted region, and the erection of new ones in a virgin field. It did not mean a change in kind or quality of lumber or any material change in price. It meant simply the securing of the same old reliable building material—white pine—from a different region. The change from soft pine to hard pine, however, called for a radical readjustment to new conditions of artisans in the wood using trades and demanded a heavy tribute from the public of the Northeast to the common carriers. This tribute evidently was one of the contributing factors which caused men to stop and think, and to put their thoughts into action which finally took shape as a national forest policy. Our ardor for forestry was weakened, however, by the apparent fact (in reality not so) that the southern pineries contained inexhaustible supplies of timber. We are again being rudely awakened by excessive prices and this time for the last time. When the Pacific Coast ceases to be an exporter of lumber—say thirty or forty years from now—there will be no other virgin North American forests awaiting exploitation. In the meantime we will get our timber from the Pacific Coast and will gladly pay the freight bill. Also in the meantime we should grow another crop of timber here on our New England hills. It can be done and at a handsome profit.

Following are two sets of graphs which show how timber regions have been exhausted one after another during the past sixty years. The values are derived by harmonizing the estimates of four leading statisticians; namely, Deffebaugh, Kellogg, the U. S. Forest Service and the U. S. Census Bureau. For sake of clarity the irregularities caused by the Civil War are rounded off.



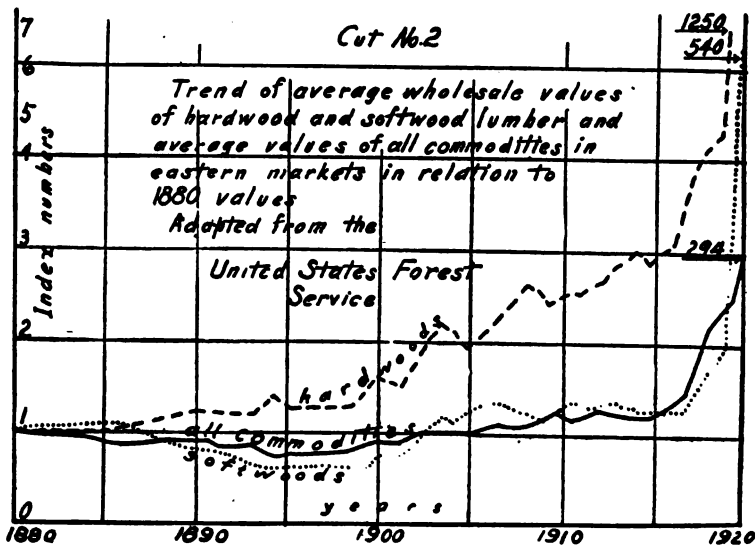
Lumber and stumpage prices:—One of the consequences of timber depletion and the migrations of the lumber industry is the very pronounced upward tendencies in timber prices. The present upheavals in price have been so violent and are still so strange and new that men who have studied on the problem have failed to determine a definite cause. Surely high wages, high freight rates, reduced stocks and heavy demand, as well as actual shortage of stumpage, are causes which tend to advance the price the consumer pays for lumber.

The following figures are taken from a report by the U. S. Forest Service, dated June 1, 1920, in answer to United States Senate Resolution Number 331, and show for eastern markets the average prices of lumber in wholesale trade for the past 25 years.

Year.	Softwoods, 1-inch Stock.		Hardwoods 1-inch Stock.	
	First Quality Per M Feet.	Average Quality Per M Feet.	First Quality Per M Feet.	Average Quality Per M Feet.
1895	\$29.39	\$16.55	\$34.52	\$24.76
1900	34.06	21.50	39.29	27.57
1903	41.93	21.20	46.43	33.72
1905	42.59	22.06	41.97	31.80
1910	43.50	24.60	49.17	35.61
1911	45.06	24.52	50.59	35.45
1912	44.53	25.29	51.44	35.73
1913	44.92	27.88	53.99	38.61
1914	42.76	25.19	54.94	38.23
1915	41.89	24.68	52.94	35.49
1916	41.53	26.86	54.59	37.64
1917	42.60	29.09	56.00	38.92
1918	51.45	39.90	66.65	46.42
1919	61.58	44.42	44.42	55.54
1920	*131.55	*73.26	*178.82	*123.80

The following graphs are adaptations of similar graphs from the above referenced report and portray graphically the relationship existing between the prices of lumber and other articles of trade.

*Figures apply to first three months.



Prior to 1920 lumber prices, in their rise and fall, followed closely the price variations of the necessities of life. More recently, however, the rise in lumber has been high compared with the rise in prices of other commodities. The degree of increase in lumber costs to the consumer seems unwarranted and is difficult to explain satisfactorily for there has been, as far as the consuming public is concerned, no increase in stumpage costs approaching in magnitude the increase in lumber costs. It seems that lumbermen and timber brokers have taken advantage of a so-called "auction" market to boost prices. Very little lumber could be obtained last winter and the little which was available went to the highest bidder. An unhealthy condition has thus been created. Lumber prices will surely recede from their present pinnacle but they never will return to the pre-war level or to the level of a year ago. The day of inexpensive lumber has gone primarily because the day of cheap stumpage has gone. Stumpage prices have increased and will continue to increase as virgin stands of timber decrease irrespective of whether lumber prices are going up or down.

Standing timber in Vermont:—In the summer of 1918 and again in the spring of 1920, the U. S. Forest Service working in cooperation with this department compiled statements concerning acreage of timber land, species of

timber and volume of standing timber in Vermont. From these statements as a base and from other sources of information chiefly original or gathered in the field by members of this department the following tabulation is submitted as the best information at present obtainable relative to our stand of timber:—

Land area of state,		5,839,000
Improved land on farms,	1,757,000	
Improved land in roads and villages (5%),	82,000	
	<u>1,839,000</u>	
Total non-wooded area in use,		<u>1,839,000</u>
Total wooded area (including abandoned fields),		4,000,000

This 4,000,000 acres may be reclassified as follows:—

1,000,000 acres waste (burn, brush, rock, alpine, roads, water, swamps and abandoned fields) @ 0 M. Ft. B.M. per acre.

1,000,000 acres sugar orchards, culled woodlots @ 2 M. B. M. per acre.

2,000,000 acres forest land @ 4 M. Ft. B. M. per acre.

There are no soft woods in the stand of the first two classes of forest land. The stand of the third class (2,000,000 acres) contains about one-third soft wood.

Percent	Species	Volume
63	Spruce	1,880,210 M
17	Hemlock	453,390 M
12	White pine	320,040 M
7	Fir	186,690 M
1	Others	26,670 M
30	Maple	2,199,900 M
21	Birch	1,539,930 M
17	Beech	1,246,610 M
9	Poplars	659,970 M
6	Basswood	439,980 M
4	Ash	293,320 M
4	Oak	293,320 M
1	Willow	73,330 M
2	Others	146,660 M

DEPARTMENTAL ORGANIZATION.

PERSONNEL.

"The Commissioner of Agriculture shall, by virtue of his office, be state forester*****. Said forester shall appoint a deputy who shall be a professionally trained forester, who shall be known and officially designated as the Chief Forester of the State of Vermont*****and said forester may employ such other assistance as the governor deems necessary*****". (Section 463, G.L.) Under the provisions of the law there is at present employed by the state and its cooperators to carry on the work of the department, one chief forester, one assistant forester, one deputy state fire warden, one field agent, one clerk, two nursery superintendents, ten district foresters and a temporary force of twenty odd men engaged in forest protection. In addition to these regular employees there is an appointive per diem fire warden service of 240 odd men.

OTHER ASSISTANCE NEEDED.

In the last biennial report a plea was made for three assistant foresters to have charge of three distinctively dissimilar classes of forest work; namely, silvicultural management, arboriculture and utilization. One of these requests has been granted. By favorable action of the Board of Control a specialist in silvicultural management was given a regular position in the forestry department effective February 1st, 1920.

The need for the other two assistants still exists even more strongly than when the need was first made known and in again calling attention to this need, attention is directed to the fact that those in charge of the forestry work have had further opportunity to acquaint themselves with the needs of the people of Vermont in their relation to good forestry. The work of one of these men would be that of a park and shade trees specialist and recreational forester. There are hundreds of little towns in the state, and farmsteads too, whose citizens or owners need the advice of such a man to help them make their towns or homes more attractive, healthful and comfortable. When property possesses such characteristics it has a greatly increased sale value and affects favorably the value of surrounding property. At present such a specialist can not be reached short of Boston or New York and then only at

prohibitive prices for his professional services. There is another field of work, closely allied to town and street forestry, worthy of being fostered which is now neglected in Vermont. I have reference to recreational forestry—that part of a forester's duties which deals with the utilization of the recreational advantages of the forest. These two fields of work will fill one man's time more than full. The other assistant forester asked for will devote his time to service, as outlined in the last biennial report, identical in the field of forestry to that of marketing and dairy specialists in the field of agriculture. The chief forester is devoting much time and attention to these classes of work but cannot do so except at a sacrifice to other fields of work which are more directly in line with timber production. The addition of these two assistant foresters to the present personnel will make the field of service in the whole department evenly balanced.

LEGISLATION.

1. RECENT AMENDMENTS.

At the last session of the legislature two amendments were enacted affecting forest taxation and forest protection which may be described as follows:—

(a) Forest taxation:—By the terms of the law as amended, lands planted to forest trees may be devoted to pasture also and receive the benefit of the provisions of No. 40 of the Acts of 1912. Also, all state forest lands may now be classified and taxed under the same law. These two amendments resulted from wider experience in forest planting and in state ownership of forest lands. The first repeals an old fallacy that grazing is ruinous to plantations, and the second virtually gives to those towns in which state forests lie, a 10% interest in these forests since one-tenth of all proceeds from stumpage sales go to the towns.

(b) Forest protection:—The law requiring the towns to furnish protection to timberlands against fire was so amended that the town and the owners of wild lands who are giving their lands no protection shall share equally in the forest protection costs. The amendment also placed the town fire warden more directly under the supervision and control of the state forester.

2. NEEDED REFORMS.

(a) Water power:—The dependence of regular stream flow upon timber cover makes the subject of navigability of streams and of water power of primary concern to the forester. As time passes falling water will be more and more utilized for power purposes, and constructive legislation aimed at fostering the enterprise should be enacted without delay. In Vermont, where there is very little public land, the matter of water storage should logically find solution through development by owners of riparian rights, but forward looking legislation should permit the collecting of toll from power site owners and users of water below any impounded source when the natural flow of the stream is not sufficient for the purposes of the plant.

(b) Slash disposal: The tide of discontent over the wanton destruction of forest resources by fire is rising and will continue to rise until it breaks into a flood of mandatory laws imposed by the federal government, unless state action is taken which will reduce to a minimum the fire hazard. Every state in New England, except Vermont, makes some provision for slash disposal following logging. The time is probably ripe, therefore, for legislation requiring the lopping and scattering of brush, the clearing of fire lanes along property lines and the burning of slash along the highways and other routes of travel where fires are likely to start.

(c) Spark arresters:—Nearly one-third of all fires which start in the forests of Vermont are reported as railroad fires. This class of fire is wholly needless and can be stopped. As an aid in this direction there should be laws requiring railroads to screen all locomotives to prevent the throwing of sparks and requiring them to build ash pans and fire boxes so that fire cannot be strewn along the right-of-way. As a further aid the railroads should be required by law to patrol along their tracks during the danger season and their patrolmen should be answerable to the state forester or his deputies.

(d) Taxation:—There is much need of reform in forest taxation. The present tax system seriously reduces the profits which should result from growing timber and leaves the stand heavily in debt to the owner at the time it is ready for harvest. In fact today no timber is cut which is 100 years or more old which has not caused its owner to pay in taxes more than the stumpage is worth. Timber cannot be taxed as other property is taxed. Com-

pound interest forbids. For example: the sum of a series of payments (taxes) and their accumulated interest for a period of 50 years, based on an ever increasing valuation identical with cost (starting with an initial valuation of \$12.00 per acre for land and young timber) amounts at 300 cents on the dollar and 4% compound interest, to \$268.21. In other words; assuming that the tax rate (300 cents on the dollar) does not change and that the assessed value of a piece of forest property changes identically with, and only by, the cost of the property to the owner in money and interest on his investment at 4% (a fair assumption) then the accumulated tax money and compound interest at 4% upon this tax money (not on the investment) will amount in 50 years to \$268.21, when the initial valuation is \$12.00 and the tax rate is 300 cents on the dollar. This represents only the tax money paid out and its accumulated interest. It does not include profit, or investment interest. From these figures it can be seen that timber lands cannot stand such a tax even on so short a rotation as 50 years. To increase the rotation even slightly means a tremendous increase in the tax burden.

A remedy lies in changing the system of taxation so that timber lands may be taxed as farm lands are taxed; namely, tax the power of the soil to produce—be it wood or potatoes or hay. A timber crop should not be taxed at 3% of its value a hundred times between seed time and harvest any more than a crop of peas or beans or grass should be so taxed.

Following is a suggested act framed to correct the inequalities cited above:—

SECTION 1.—Lands which lie wholly outside the limits of a city or village and which, in the judgment of the listers, are well stocked with forest trees shall be known for taxation purposes as forest lands. The state forester shall, on January first, in each quadrennial year, direct to the tax commissioner a statement suggesting what constitutes a well stocked stand and what species of trees may be classed as forest trees, provided however, that neither pin nor bird cherry, *Prunus pennsylvanica*, L., nor grey birch, *Betula populifolia*, Marsh, shall be classed by the listers as forest trees.

SECTION 2.—Timber on forest land in one hundred acre lots or less shall be classified in the judgment of the listers into immature, mature or over-mature stands. The state forester shall, on January first, in each quadrennial year, direct to the tax commissioner a statement suggesting what

constitutes an immature, mature or over-mature stand, provided that all timber once classed as immature shall be classed as mature before it may be classed as over-mature and that no mature stand shall be classed as such for less than four years or for more than twelve years unless some of the timber has been cut.

SECTION 3.—Forest land shall be taxed annually under the general tax law on a valuation of the land alone based on its power to grow timber. Also overmature stands shall be taxed annually as personal property on a full stumpage valuation but no other tax shall be assessed against forest timber. The state forester shall, on January first, in each quadrennial year, direct to the tax commissioner a statement suggesting what the value of land is when devoted to timber production providing that no forest land shall be set in the list by the listers at more than \$10.00 or less than \$5.00 per acre and providing further that no other class of land capable of producing forest growth shall be given a lower valuation than forest land.

SECTION 4. When any appeal is taken to the tax commissioner in accordance with section 842 of the General Laws of Vermont on account of any action, appraisal or determination under the provisions of this act there shall be a fourth appraiser who shall be the state forester and in the event of a majority of such board failing to agree the chairman thereof shall have an additional vote which shall be decisive.

SECTION 5. This act shall become a part of Chapters 42 and 43 of the General Laws.

SECTION 6.—Sections 721 to 731, both inclusive, of the General Laws are hereby repealed.

EDUCATIONAL WORK.

Advice to private owners:—The forestry department has continued its usual policy of giving to owners of woodlands within the state such assistance as time will permit us to give. The object sought is a better handling of the timberlands of the state from a silvicultural standpoint. Several tracts have been marked for cutting, a number of other tracts have been examined and advice given to the owners and still other tracts have been examined to determine their volume in lumber. This latter service is rendered only when there is little or no other work demanding attention in the department.

In addition to the services outlined above the forestry department has also maintained an information bureau through which it has endeavored to place before the manufacturers of lumber in the state reliable quotations on lumber prices and such other information as will tend to enable manufacturers to market their product to better advantage. This service is being rendered with the hope that a portion of the benefit derived will accrue to the owners of stumpage, who, in many cases at least if not most, are the farmers of the state.

Lectures and meetings:—During the two years' period covered by this report various associations of foresters have met together in New York, Boston, Portland, Albany, Durham, N. H., Kineo, Me., and Bethlehem, N. H. At each of these meetings the chief forester represented the state at a conference where national forest policies were under formation or where matters pertaining to better forest protection, especially against forest fires and diseases, were under discussion. Whenever called upon the forester has lectured on several phases of forestry work and has, as a part of his regular duties, cooperated with the University of Vermont in giving regular courses of instruction in the agricultural college.

Fairs:—Mr. Henry B. Hall, superintendent of the state forest nursery at Burlington, attended the county fairs, where he put on small forestry exhibits. These exhibits consisted of tree seedlings of various kinds and ages, posters illustrating the effects of care and carelessness with fire in the woods, large photographs showing how barren land may be reclaimed by planting forest trees, and photographs showing forest plantations at various stages of growth. In addition, Mr. Hall in conversation interested people in forestry and distributed free literature describing methods of forest planting, protection and care.

At the Eastern States Exposition in Springfield, Massachusetts, a Natural Resources exhibit was shown by the forestry department. A pergola 16x24 feet was built of white birch logs a foot or more in diameter. The pergola was enclosed on three sides by a hedge made of young juniper trees, the white birch logs were wound with Christmas greens and the floor, which was covered with heavy tag stock paper, was colored dark green to carry out the color scheme. The entrance to the pergola was in front between the two central posts, and on either side of this entrance was a granite urn in which stood a small juniper tree. On each side of this entrance also, and extending across the

front of the pergola, were two large show cases made from a birch log nearly four feet in diameter. The log was split in half, each half was hollowed out as our forefathers used to do in making a watering trough, lined with velvet and covered with plate glass to make the show cases. In one of these was an exhibit of as many articles as it was possible to collect, made from wood, and over this case hung a large sign in green and white "Forest Products". In the other case were placed samples of marble, granite, talc, asbestos, slate and lime and over this was a companion sign, saying, "Mineral Products." Inside the pergola was an exhibit of several set pieces of granite contributed by Boutwell, Milne and Varnum, of Montpelier, which contrasted pleasingly with the dark green of the juniper trees. Here also were chairs and a table for the pleasure of guests from Vermont.

REFORESTATION.

(a) Policy:—There has been a movement under way for a generation or more taking the people off the back farms in Vermont. The cause for this migration may be traced to a number of widely different conditions, no one of which is peculiar to Vermont alone. Chief among these is the ever increasing use of farm machinery in the conduct of regular farm work and the back farms of Vermont, owing to rugged topography, are ill adapted to the use of tractors and heavy harvesting machinery. These lands when abandoned will come back naturally to tree growth or should be planted to forest tree seedlings. It is the policy of the forestry department to encourage the establishment of a forest cover on all lands not actively in use for agriculture irrespective of the character of the land. There are on nearly every farm in the state a few treeless acres which are poorly adapted to cultivation or pasture and which should be planted to trees. Through the efforts of the county agricultural agents, the granges, the various commercial clubs and similar organizations, and especially through the activities of the district foresters and town fire wardens, enough interest will soon be centered about these waste acres to insure that they will be planted. A ten acre forest plantation of spruce or pine if properly handled will yield at maturity enough lumber to build a complete set of farm buildings in keeping with the houses and barns of a prosperous farming community and adequate for the needs of a dairy farm having one hundred acres of tillage land.

The forestry department is prepared to furnish forest tree seedlings at cost for outplanting in the state of Vermont.

(b) Nurseries:—The state forestry department maintains two nurseries for the production of forest tree seedlings. Each nursery has an annual output capacity of one million trees, but owing to high labor costs only one of these is run at capacity; namely, the Burlington nursery, which is under the immediate supervision of Henry B. Hall. The law requires the maintenance of these nurseries and requires that their product be sold at cost to land owners of Vermont.

Following is a statement of the sale prices (called cost) of seedlings and transplants ready for shipment at the Burlington nursery for the past five years.

	1916		1917		1918		1919		1920	
	Seed- lings	Transp lings	Seed- lings	Transp lings	Seed- lings	Transp lings	Seed- lings	Transp lings	Seed- lings	Transp lings
Red pine		5.00		5.00	3.75	5.75	3.27	5.75	*	7.00
Scotch pine	2.50	5.00	2.50	5.00	2.75	5.00	2.75	5.00	3.25	6.25
Norway spruce		5.00		5.00	2.75	5.00	3.00	5.50	3.25	6.50
White pine	2.50	5.00	*	*	*	*	*	*	*	*

It can be seen in the above table that the price for nursery stock has not kept pace with the rise in price of most commodities. This is explained by the fact that much of the cost entering into the price of a thousand transplants occurred several years ago. Not until the spring of 1922 will the nursery stock resulting from this spring's transplanting labor be sold to the public. The price of nursery stock to Vermont farmers will then be about ten dollars per thousand.

The actual costs of producing seedlings and transplants for the years 1913, 1918 and 1920 are compared:—

First year,	'13		'18		'20
Seed,	.63		.65		.71
Manure,	.10		.12		.02
Labor,	.60		.50		.93
Use of equipment,	.30		.40		.60
Supervision,	.20		.17		.17
Clerical force,	.08		.01		.01
Telephone,	.03		.01		.01
Water,	.02	1.96	.01	1.87	.01 2.75

*Not grown in the nurseries.

Second year:

Labor and water,	<u>.24 2.20</u>	<u>.29 2.16</u>	<u>*.29 3.04</u>
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Third year:

Transplanting,	.90	1.04	1.09
Care,	1.00	1.30	1.46
Fertilizer,	.25	.36	.04
Water,	.04	.02	*.02
Boxes and moss,	.03	.06	*.06
Packing, labor,	<u>.53 4.95</u>	<u>.64 5.98</u>	<u>.51 6.22</u>

High prices of lumber have caused a 50% increase in the costs attributed to equipment use and labor costs have increased 22.5%. Varieties have been limited to a few undesirable species and prices have been unusually high. As a consequence the nurseries are at present over supplied with European and Japanese Larch. *Pinus resinosa* and *Picea alba*, two desirable species, were impossible to get at any price.

Seed prices were as follows:—

	1913	1919	1920
<i>Pinus contorta</i> ,			\$5.00
<i>Pinus sylvestris</i> ,	\$1.75	\$2.75	2.75
<i>Picea excelsa</i> ,	1.00	2.75	2.25
<i>Fraxinus Americana</i> ,	.18	.60	.75
<i>Tilia Americana</i> ,	.40	.60	.75
<i>Larix Europaea</i> ,	1.50	2.75	2.50
<i>Larix Leptolepis</i> ,		3.50	5.00
<i>Larix occidentalis</i> ,			7.50

Inventories:—Midsummer stock taking in the nurseries revealed the following seedlings and transplants:—

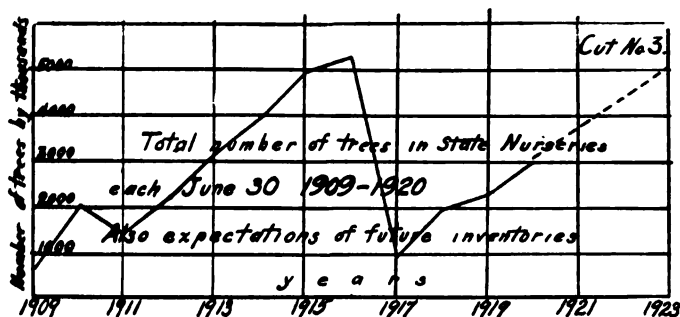
Year.	1+0	2+0	2+1	2+2	Total
1919	840,000	606,000	834,000	550	2,280,550
1920	1,364,000	796,000	598,900	227,000	2,985,900

Ages are reported as one year or two years etc. when in reality the seedlings are eight months younger than reported. The 1-0 stock has hardly ceased to germinate and the 2+0, 2+1, 2+2 stock must winter over before it is two, three or four years old. By comparing the figures in the above table with the predictions in the last biennial report it will be noted that there is a shrinkage of 68,100 trees in

*Items based on 1918 figures.

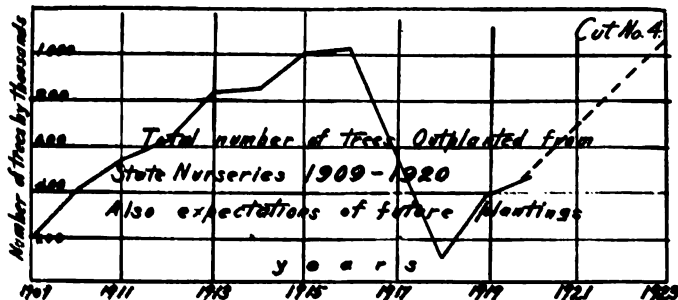
excess of normal shrinkage. This is accounted for by the fact that the Douglas fir, Sitka spruce and European larch seedlings winter-killed beyond expectation.

The following graph shows the nursery situation since 1912.



(c) Outplanting:—All trees large enough for planting were shipped from the nurseries in the springs of 1919 and 1920, except in each of these years one small block of Norway spruce, which might have been outplanted, was held over for further growth. For the past four years all nursery stock which was ready for shipment at the time of spring planting has been sold each year. Interest, therefore, has not fallen off in planting. It will be another three years before both of the nurseries will be back to their former capacity.

The following graph shows the number of trees planted each spring from 1909 to 1920.



PLANTATIONS BY COUNTIES, MADE IN 1919.

ADDISON COUNTY.

Bristol,	John A. Kilbourn,	1,000	Scotch pine.
Lincoln,	C. A. Purinton,	1,000	Scotch pine.
West Cornwall,	Arthur W. Bingham,	2,000	Norway spruce

BENNINGTON COUNTY.

Bennington,	A. J. Dewey,	2,000	Norway spruce 4 yr.
	The Orchards,	15,000	red pine
		20,000	Norway spruce 3 yr.
Dorset,	Anna E. Gilbert,	1,000	Norway spruce 4 yr.

CALEDONIA COUNTY.

Danville,	J. B. Stanton,	500	Scotch pine
Groton,	Burton L. Brown,	1,000	Scotch pine
	J. W. Eastman,	100	Scotch pine
Peacham,	Forestry Dept., State of Vt.	26,400	Norway spruce 4 yr.
Ryegate,	Peter M. Abbott,	1,000	Scotch pine
St. Johnsbury,	George W. Caldbeck,	5,000	red pine
		3,000	Norway spruce 4 yr.
Waterford,	Luman A. Ladd,	100	Scotch pine
		100	red pine
		100	Norway spruce 3 yr.
		100	Norway spruce 4 yr.

CHITTENDEN COUNTY.

Burlington,	U. A. Woodbury II.	5,000	fir balsam 3 yr.
Colchester,	Dr. Daniel A. Shea,	500	Scotch pine
		500	Norway spruce 4 yr.

ESSEX COUNTY.

Brighton,	Howard H. Hobson,	1,000	Scotch pine
		1,000	Norway spruce 4 yr

FRANKLIN COUNTY.

Enosburg,	L. L. Marsh,	1,500	red pine
		1,500	Norway spruce 3 yr.
Fairfield,	A. H. Fisher,	1,000	Norway spruce 4 yr.
Swanton,	P. J. Farrell,	1,000	Scotch pine
		500	Norway spruce 4 yr.

LAMOILLE COUNTY.

Johnson,	State Normal School,	500	red pine
	Albert H. Stiles,	1,000	Scotch pine
		1,000	red pine

ORANGE COUNTY.

Bradford,	E. B. Shumway,	5,000	Scotch pine
Chelsea,	Stanley C. Wilson,	2,000	Norway spruce 3 yr.
Randolph,	A. A. Priest,	1,000	red pine
Thetford,	Maurice C. Bond,	500	Scotch pine
		2,500	red pine
	Chas. C. Cook,	1,500	Scotch pine
Tunbridge,	Elmer E. Howe,	2,000	Scotch pine
	J. W. Sherlock,	2,000	Scotch pine
Waits River,	Ernest S. Locke,	800	Scotch pine
		200	red pine
Washington,	Mrs. E. J. Fish,	2,000	Scotch pine
West Corinth,	C. L. Speare,	2,000	Scotch pine
West Fairlee,	H. M. Miller,	1,000	red pine

ORLEANS COUNTY.

Barton,	J. H. Bartlett,	200	Norway spruce 3 yr.
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RUTLAND COUNTY.

Chittenden,	G. H. Tozier,	1,000	Norway spruce 3 yr.
Clarendon,	H. Balch,	7,000	Norway spruce 3 yr.
Cuttingsville,	O. G. Knight,	1,000	red pine
Hubbardton,	Penhryn Slate Co.	5,000	Norway spruce 4 yr.
Mendon,	Gustaf H. Nelson,	1,000	Scotch pine
	City of Rutland, Water		
	Dept.	20,000	Scotch pine
		60,000	red pine
	Forestry Dept., State of		
	Vt.	37,000	Norway spruce 4 yr.
		9,000	Norway spruce 3 yr.
Proctor and			
Pittsford,	Emily Dutton Proctor,	5,000	Scotch pine
		4,000	Norway spruce
Shrewsbury,	T. G. Pearson,	100	red pine
		450	Norway spruce 3 yr.
Wallingford,	R. C. Taft,	2,000	red pine

WASHINGTON COUNTY.

Marshfield,	Forestry Dept., State of		
	Vt.	12,000	fir balsam 3 yr.
Montpelier,	T. D. Hobart,	200	Scotch pine
		100	red pine
		400	Norway spruce 4 yr.
	George H. Rumney,	2,000	Norway spruce 3 yr.
Moretown,	Herbert G. Ward,	3,000	Scotch pine
Northfield,	G. O. Sanborn,	1,000	Norway spruce
Plainfield,	Forestry Dept. State of		
	Vt.	8,500	red pine
		9,000	Norway spruce 3 yr.
Waitsfield,	W. H. Moriarity,	2,000	Norway spruce 4 yr.

WINDHAM COUNTY.

Guilford,	Mrs. Lester S. Barber,	1,000 Scotch pine
		1,000 red pine
Westminster,	E. F. Evans & Son,	1,000 red pine
	A. M. Bragg,	1,200 red pine
Windham,		1,200 Norway spruce 4 yr.
	A. G. Burbee,	1,000 Scotch pine
		1,000 red pine
	Chas. Fontaine,	1,000 Norway spruce 4 yr.
		1,000 red pine

WINDSOR COUNTY.

Barnard,	B. H. Lamb,	750 Scotch pine
		250 red pine
Bridgewater and Woodstock,	C. I. Davis & A. R. Weeden,	2,000 Norway spruce 3 yr.
		1,000 Norway spruce 3 yr.
Cavendish, Hartland,	Gay Brothers Co., Nathaniel Jenne,	500 red pine
		1,000 Scotch pine
Ludlow,	W. H. Seaver, Ernest E. Moore,	2,000 Norway spruce 3 yr.
		1,000 Scotch pine
Pomfret,	T. D. Bugbee,	1,000 Scotch pine
Tunbridge, Woodstock,	J. S. Tower, F. L. Copeland,	1,000 red pine
		3,000 Norway spruce 3 yr.
		1,000 Scotch pine
	R. M. Marble,	3,000 red pine
	Charlotte L. Noyes,	5,000 Scotch pine
		5,000 red pine
	Upwey Farms,	4,000 Scotch pine
		1,000 red pine

PLANTATIONS BY COUNTIES, MADE IN 1920.

ADDISON COUNTY.

Bristol,	Milton E. Elliott,	1,000 Norway spruce 3 yr.
	Maurice A. Bingham,	1,000 red pine
So. Lincoln,	E. S. Stearns,	5,000 Norway spruce 3 yr.

BENNINGTON COUNTY.

Arlington,	John R. Fisher,	1,000 Scotch pine
		4,000 red pine
Bennington,	Arthur J. Dewey,	1,000 red pine
		3,000 Norway spruce 4 yr.
	The Orchards,	2,000 Scotch pine
		3,000 Norway spruce 3 yr.
	H. W. Putnam Memorial Hospital,	500 Scotch pine
		500 Norway spruce 4 yr.
Dorset,	James B. Herrick,	750 red pine
		500 Norway spruce 4 yr.
Manchester Ctr.,	James D. Purdy,	1,000 Scotch pine

CALEDONIA COUNTY.

Groton,	Peter M. Abbott,	1,120	Scotch pine
	Burton L. Brown,	3,000	Scotch pine
	Robert N. Brown,	3,000	Scotch pine
	E. E. Darling,	1,000	Scotch pine
	George S. Welch,	5,000	Scotch pine
Hardwick,	Hardwick Village Corp.,	500	Scotch pine
		500	Norway spruce 3 yr.
Lyndonville,	William H. Greene,	2,000	Scotch pine
St. Johnsbury,	Alexander Dunnett,	5,000	red pine
		1,000	Norway spruce
	U. S. Bureau of Fisheries,	500	red pine

CHITTENDEN COUNTY.

Burlington,	F. J. Arnold,	2,000	Scotch pine
	St. Joseph's Cemetery,	1,000	Scotch pine

ESSEX COUNTY.

Island Pond,	B. W. Farmer,	1,000	red pine
	Howard H. Hobson,	300	Scotch pine
		1,000	red pine
		1,000	Norway spruce 3 yr.

FRANKLIN COUNTY.

Bakersfield, Franklin, Highgate,	Arthur C. Wells,	1,000	Scotch pine
	Charles W. Gates,	1,000	red pine
	Highgate High School,	15	Scotch pine
		15	red pine
		15	Norway spruce
Swanton,	P. J. Farrell,	500	Scotch pine
		500	Norway spruce 4 yr.

LAMOILLE COUNTY.

Johnson,	P. S. French,	2,000	Scotch pine
	H. O. Stiles,	2,000	red pine

ORANGE COUNTY.

Chelsea,	Warren L. Walker,	1,000	Norway spruce 3 yr.
	Stanley C. Wilson,	3,000	Norway spruce 3 yr.
Randolph Ctr., Thetford,	E. F. Kibby,	1,000	Norway spruce 4 yr.
	Maurice C. Bond,	1,000	Scotch pine
		3,000	red pine
		1,000	Norway spruce 4 yr.
	William E. Bond,	500	red pine
		500	Norway spruce 3 yr.
West Fairlee,	Christine Vaughan,	500	Scotch pine
	H. M. Miller,	1,000	Scotch pine

ORLEANS COUNTY.

Albany,	Archie Stone,	1,000	Scotch pine
Coventry,	J. J. LaBelle,	1,000	red pine
Glover,	B. M. Sherburne,	3,600	Scotch pine
No. Troy,	Charles R. Holden,	1,200	Scotch pine
Orleans,	M. W. Parker,	1,200	red pine
West Glover,	Clyde S. Vance,	1,200	Scotch pine

RUTLAND COUNTY.

Mendon,	Forestry Dept., State of	40,000	Norway spruce
	Vt.,		
No. Clarendon,	H. Balch,	1,000	Scotch pine
		500	red pine
		500	Norway spruce 3 yr.
	G. A. Nelson,	3,000	Scotch pine
Proctor,	Frank C. Partridge,	4,000	red pine
Rutland,	City of Rutland, Water		
	Dept.	60,000	Norway spruce 4 yr.
		500	white ash
	John F. Eddy,	1,000	Scotch pine
		1,000	Norway spruce 3 yr.
		500	Norway spruce 4 yr.
	Corrada A. Ratti,	1,000	red pine
Pittsfield,	G. H. Tozier,	1,000	Scotch pine
		3,000	Norway spruce 4 yr.
West Rutland,	Frank Teer,	500	red pine

WASHINGTON COUNTY.

Barre,	L. D. Martin,	2,000	red pine
Cabot,	L. C. Fisher,	11,000	Norway spruce 4 yr.
Marshfield,	Forestry Dept., State of		
	Vt.	70,000	red pine
		50,000	Scotch pine
Montpelier,	W. W. Brock,	5,000	red pine
	T. D. Hobart,	500	Scotch pine
		500	red pine
		500	Norway spruce 4 yr.
	Hermon D. Hopkins,	12	Norway spruce
		12	Scotch pine
	City of Montpelier,	20,000	Scotch pine
	O. L. Tillotson,	1,000	Scotch pine
		1,000	red pine
Northfield,	E. W. Clark,	500	Norway spruce 3 yr.
	C. A. Edgerton,	1,000	Norway spruce 4 yr.
	Malverd A. Howe,	1,000	red pine
No. Montpelier,	George Daniels,	4,000	red pine
	Harvey R. Warren,	2,000	red pine
Waitsfield,	Dan Folsom,	1,000	Scotch pine
	E. H. Jones,	1,000	red pine
Waterbury,	Ralph W. Putnam,	2,500	Scotch pine
	Alton G. Wheeler,	3,000	Scotch pine
		1,000	red pine
		500	Tamarack

WINDHAM COUNTY.

Bellows Falls,	Bellows Falls Village Corp., Water Dept., John H. Blodgett,	1,000 Norway spruce 3 yr.
		1,150 red pine
		2,000 red pine
		3,500 Norway spruce 3 yr.
Brattleboro,	Mrs. Lester S. Barber, E. B. Barrows, F. C. Holbrook, Estey Organ Co.,	2,000 red pine
		5,000 Scotch pine
		3,000 red pine
		5,000 red pine
Williamsville, Windham,	A. M. Merrifield, A. G. Burbee,	1,000 red pine
		2,000 Scotch pine
		1,000 Norway spruce 4 yr.

WINDSOR COUNTY.

Bethel,	E. L. Bass, George G. Waite, Morris H. Cone, Ernest E. Moore,	5,000 red pine
		592 Norway spruce 4 yr.
		500 red pine
		1,000 Norway spruce 3 yr.
Brownsville,	Fred D. Nash, Citizens Water Co., F. H. Harvey,	2,000 Scotch pine
		2,000 Scotch pine
		1,208 Scotch pine
		604 Norway spruce 3 yr.
Hartford,	T. D. Bugbee, Allen Hazen, Mrs. Ralph E. Doble,	2,000 Scotch pine
		2,000 red pine
		2,000 red pine
		1,500 Scotch pine
Ludlow,	E. G. Bailey, Franklin S. Billings, Frederick Chapman, Agt. H. B. Chapman,	1,000 red pine
		100 Scotch pine
		100 Norway spruce 3 yr.
		2,000 red pine
No. Springfield,	Edith E. McCausland, Richard M. Marble, Arthur Maynes, A. L. Powers,	10,000 red pine
		1,000 red pine
		1,000 red pine
		1,000 red pine
So. Royalton,	T. D. Bugbee, Allen Hazen, Mrs. Ralph E. Doble,	2,000 Scotch pine
		2,000 red pine
		2,000 red pine
		1,500 Scotch pine
Taftsville,	E. G. Bailey, Franklin S. Billings, Frederick Chapman, Agt. H. B. Chapman,	1,000 red pine
		100 Scotch pine
		100 Norway spruce 3 yr.
		2,000 red pine
White River Jct.	Edith E. McCausland, Richard M. Marble, Arthur Maynes, A. L. Powers,	10,000 red pine
		1,000 red pine
		1,000 red pine
		1,000 red pine
Windsor,	D. J. Camp, Holden & Martin, A. L. Powers, Billings Estate,	10,250
		10,000
		16,000
		21,000
Woodstock,	D. J. Camp, Holden & Martin, A. L. Powers, Billings Estate,	10,250
		10,000
		16,000
		21,000

LIST OF PLANTERS WHO HAVE PLANTED 10,000 TO 25,000
TREES IN ANY ONE YEAR.

1909

Randolph,	D. J. Camp,	10,250
Brattleboro,	Holden & Martin,	10,000
Woodstock,	A. L. Powers,	16,000
	Billings Estate,	21,000

1910

Groton,	Alfred Helle,	11,000
Milton,	Ricker Bros.,	10,000
Newbury,	D. T. Hanley,	13,000
Troy,	Nelson W. Bailey,	10,000
Marshfield,	Chas. R. Holden,	10,000
Brattleboro,	Laird & Howland,	20,000
	H. E. Eddy,	10,000
	Holden & Martin,	15,000
Hartland,	C. B. Hemenway,	10,000
Rochester,	J. A. Cannon,	14,000
Windsor,	E. D. Swain,	12,000

1911

Berlin,	T. D. Hobart,	12,000
Manchester,	J. C. Bradley,	10,000
Lyndon,	E. A. Darling,	10,000
	T. N. Vail,	15,300
Hyde Park,	Harold Jewett,	23,000
Brandon,	Newton & Thompson Mfg. Co.,	10,000
Rockingham,	J. H. Lawrence,	10,000
Chester,	Geo. F. Marsh,	20,000
Rochester,	J. A. Cannon,	10,000
Springfield,	W. D. Woolson,	20,300

1912

Woodstock,	B. Noyes,	10,000
Cavendish,	E. F. Hodges,	12,000
Hartford,	C. C. Johnson,	10,000
Quechee,	Quechee Fells Farms,	19,000
Rochester,	J. A. Cannon,	10,000
Weathersfield,	Miss Mary U. Woodbury,	10,000
Woodstock,	Bridgewater Woolen Co.,	16,000
	Cloudland Farm,	10,000
Marshfield,	C. H. Utley,	10,000
Brandon,	Newton & Thompson Mfg. Co.,	11,700
Berlin,	T. D. Hobart,	15,000
Middlesex,	R. W. Putnam,	10,000
Dummerston,	Scott Farm,	20,000

1913

Arlington,	John R. Fisher,	25,000
So. Burlington,	University of Vt.,	14,200
Maldstone,	Mrs. Harland B. Howe,	10,000
Brandon,	Newton & Thompson Mfg. Co.,	20,000
Marlboro,	Estey Organ Co.,	18,000
Springfield,	Miss Mary U. Woodbury,	10,200
Woodstock,	Edward H. Williams,	10,000
	Bridgewater Woolen Co.,	25,000

1914

Arlington,	John R. Fisher,	12,000
Hardwick,	Ira R. Kent,	10,000
Proctor,	Emily D. Proctor,	20,000
Middlesex,	Ralph W. Putnam,	13,000
Warren,	Jones Lumber Co.,	10,000
Londonderry,	Lee S. Haven,	10,000
West Windsor,	Geo. G. Waite,	10,000
Woodstock,	A. L. Powers,	18,500
	Edgar H. Williams,	10,000

1915

Arlington,	John R. Fisher,	10,200
St. Johnsbury,	George W. Caldbeck,	12,000
Pittsford,	Vt. Sanatorium,	10,000
Cabot,	L. C. Fisher,	10,000
Calais,	Henry Holt,	10,000
Middlesex,	Ralph Putnam,	14,000
Brattleboro,	J. M. Johnson, Jr.,	10,000
Londonderry,	Williams Bros.,	20,000

1916

Bennington,	The Orchards,	14,000
St. Johnsbury,	Geo. W. Caldbeck,	20,000
So. Burlington,	University of Vermont,	20,000
Concord,	Harry A. Ranney,	14,000
Williamstown,	Chas. H. Beckett,	12,000
Proctor,	Emily D. Proctor,	25,000
West Rutland,	Frank Partridge,	25,000
Calais,	Ralph Putnam,	10,000
Northfield,	Chas. A. Plumley,	10,000
Waterbury,	Vt. Hospital for Insane,	10,000

1917-18

Ripton,	W. C. Duncan,	12,000
Bennington,	The Orchards,	23,000
Barnet,	Wilbur Nelson,	10,000
Montpelier,	W. H. Martin,	10,000
Newfane,	Ariel Cameron,	12,000
Proctorsville,	C. M. Cook,	15,000
Woodstock,	Billings Estate,	24,000

1919

Woodstock,	Charlotte L. Noyes,	10,000
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1920

Cabot,	L. C. Fisher,	11,000
Woodstock,	Richard M. Marble,	10,000

**LIST OF PLANTERS WHO HAVE PLANTED MORE THAN 25,000
TREES IN ANY ONE YEAR.**

1910

Enosburg,	Dr. Wm. S. Stevens,	40,000
Springfield,	W. D. Woolson,	40,000

1911

Enosburg,	Dr. Wm. S. Stevens,	34,000
Proctor,	Vermont Marble Co.,	75,000
Rutland,	Rutland Ry. Light & Power Co.,	48,000
Brattleboro,	Scott Farms,	26,000

1912

Middlebury,	M. W. Brewster,	40,000
Enosburg,	Dr. Wm. S. Stevens,	40,000
Rutland,	Rutland Ry. Light & Power Co.,	60,000

1913

Lyndon,	Our Husbands Mfg. Co.,	52,000
Enosburg,	Dr. Wm. S. Stevens,	47,000

1914

St. Johnsbury,	Fairbanks Scale Co.,	100,000
Enosburg,	Dr. Wm. S. Stevens,	52,000
Bridgewater,	Bridgewater Woolen Co.,	30,000
Royalton,	W. A. Blodgett,	30,000
Sharon,	H. C. Porter,	37,000

1915

Enosburg,	Dr. Wm. S. Stevens,	50,000
Chester,	Vermont Marble Co.,	30,000
Sharon,	Church Men's Club,	29,625
	W. C. Porter,	29,000

1916

Enosburg,	Dr. Wm. S. Stevens,	50,000
Grafton,	Vermont Marble Co.,	50,000

1917-18

Marshfield,	D. P. Cameron,	29,000
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1919

Bennington,	The Orchards,	35,000
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LIST OF PLANTERS WHO HAVE PLANTED TREES FOR FIVE YEARS OR MORE.

Barre,	D. A. Perry,	12,000
Berlin,	T. D. Hobart,	73,250
Middlesex,	R. W. Putnam,	49,500
Groton,	P. M. Abbott,	6,000
Enosburg,	Dr. Wm. S. Stevens,	273,000
Swanton,	P. J. Farrell,	35,000
Braintree,	George W. Flagg,	33,200
West Fairlee,	Harris M. Miller,	7,000
Randolph,	A. A. Priest,	23,000
Thetford,	Miss Christine Vaughn,	8,000
Proctor,	Miss Emily D. Proctor,	62,000
Sharon,	J. J. Parker,	5,000
Woodstock,	A. L. Powers,	13,000

FOREST PROTECTION.

(a) Fire:—The fire seasons of 1918 and 1919 like those of 1916 and 1917 were exceedingly light taking the individual season as a whole. In each of the four years a short period of drought was experienced and fires got under way. These danger periods, however, were followed in each case by a midsummer period of rain. During the 1918 and 1919 danger periods the town fire wardens were circularized by this department and directed to extinguish any fire promptly at any cost. The object was to keep the fires that did start confined to a small area. The results of our efforts in this direction have been fairly satisfactory and the comparative results when one year's record is viewed with another show encouraging progress.

The town wardens were repeatedly cautioned to spare no time or effort or expense in reaching a fire as soon as it was reported and to do all in their power to learn of fires promptly. The yearly records show conclusively that the cost of putting a fire out varies directly with age of the fire when reached by the warden or others. Therefore, from a money saving point of view fires must be discovered, reported and put out quickly.

In these records it will be seen that the expenditure of money on small fires at seemingly a reckless rate is in reality money well spent. A good fire warden will save his town hundreds of dollars each year by prompt action.

During the last four years timber values have advanced so rapidly that the value of growing trees however small or immature is no longer a question in the popular mind. Everyone knows that timber land is valuable not alone for the crop which may be harvested at the present time but also for the growing stand of infant trees which will produce timber in the future. Everyone also knows that the great enemy of timber reproduction is fire. While this is recognized in a general way it is well to keep in mind the fact that the public as well as the land owner has an active interest in forest land protection in general and of each individual tract in particular. Whenever an individual suffers loss of property by fire or flood the entire community loses with him to some extent but in the event of destruction of timber or forest trees by fire the community loss is often much in excess of the loss sustained by the individual. This being the case it is fitting that the community should bear a proportionately larger share in the cost of protection of our forests from damage and destruction by fire. It is fair to the individual land owner that he do his part toward the protection of his own property and under the present management the expense of fire protection is divided equally between the community or town organization and the owners of wild or forest land who make no effort to furnish fire protection for this class of property.

Presumably so long as fire and inflammable material continue to exist there will be an occasional conflagration, but every effort should be directed toward reducing loss thereby to the minimum.

Following are records of forest fires as reported for the past two years. This period as shown by the following tables has given less fire loss than any similar period since 1909 and 1910, and materially reduces the ten year average. This comparatively small loss is accounted for in part by the weather conditions which have been unfavorable for serious fires, to the greater interest in fire protection in the minds of the travelling public as well as the land owners and to constantly improving services of the state organization in cooperation with the local officials. As evidence of this attention is called to the fact that of the 53 fires reported during the year 1918 over 64% were discovered and extinguished before any considerable damage had occurred, while of the 68 fires reported in 1919 over 75% were rendered harmless by prompt action on the part of those discovering or reporting the fires. The percentage of loss would undoubtedly be greater during a dry season but the ready

response of the public to cooperate in fire protection is gratifying to those having this interest at heart.

SUMMARY OF FIRE REPORTS.

Origin of Fire.	1918	1919
Sparks from locomotives or trains,	21	14
Burning grass or brush,	11	14
Lightning,	2	1
Matches dropped by smokers or campers,	7	8
Children playing with matches,	1	1
Incendiary,	1	4
Undetermined causes,	10	26
	<u>53</u>	<u>68</u>
Statistics		
Number extinguished with little or no damage,	34	51
	64%	75%
Number of fires confined to 1 acre or less,	16	30
Number of fires confined to 5 acres or less,	27	48
Total acres burned by fires of 5 acres or less,	43	55
Average area,	1.6	1.1
Number of fires over 5 acres,	26	20
Acres burned by fire of more than 5 acres,	2574	769
Average area by fire of more than 5 acres,	99	38.4
Cost of extinguishing fires, total,	\$582.27	\$1,008.77
Excess of 1919 over 1918 costs, total,		\$426.50
Average cost per fire,	\$10.98	\$16.01
Excess of cost, average per fire,		\$5.03
Total acres burned over,	2617	824
Average area per fire,	49 2-5	12 1/4
Average reduction in area burned, acres,		37 1/4
Average reduction of loss on 37 1/4 acres at \$8.91 per acre,		\$331.89
Total 17 fires, loss reduction,		\$5,642.13
Area burned which was open pasture or meadow or so slightly burned as to do little damage,	702 1/2	496 1/2
Area burned on which damage was reported,	1904 1/2	327 1/2
Total damage reported,	\$3,095.00	\$2,919.00
Average damage per acre,	1.83	8.91
Cost of extinguishing fires in which no damage occurred,	239.10	415.57
Cost of extinguishing fires in which damage occurred,	343.17	593.20
Number of towns in which no fires were reported,	215	205
Number of towns reporting fires,	32	42

The following distribution of expenditures shows the activities of the forestry department in fire detection:—

	1918	1919
Lookout watchman,	\$ 648.14	\$1,106.44
Patrolmen,		704.83
Rangers,	387.53	175.00
Construction,	474.65	1,309.75
Administration,	242.50	546.37
Publicity,	54.75	575.00
Miscellaneous,	2.47	208.82
	\$1,801.04	\$4,626.21

The state of Vermont through the forestry department has cooperated since 1913 with the U. S. forest service in the protection of the forests of Vermont against fire. The state forestry department has cooperated also with the Vermont Timberland Owners' Association for a like purpose. The sum spent by the state in fire prevention and detection has been augmented by these cooperating parties by approximately six thousand dollars each year. The money spent by the Federal government, the state and the association for the period (two calendar years) amounts to \$3,992.04, \$6,436.25 and \$5,124.53 respectively. In addition to these sums the towns have spent also a total of \$1,591.04 which is \$3,864.00 below an average figure of \$5,455.00 for a two year period. The average yearly expenditure by all organized fire control agencies is approximately \$10,000.00 or about five mills per acre on an area of 2,000,000 acres.

Watch towers:—In the summer of 1918 a study was made of the efficaciousness of each fire lookout station and of a number of potential sites. The result led to the construction in 1919 of telephone lines, towers, cabins and trails on two mountains; namely, Belvidere and Spruce Mountains, in the towns of Belvidere and Plainfield respectively. Also mountain telephone lines were erected on Ascutney and Owl's Head in the towns of Windsor and Peacham respectively. Cushman Mountain in the town of Rochester was also decided upon as a lookout point as well as Haystack Mountain in Wilmington and Westmore near Willoughby Lake. In the spring of 1920 the Vermont Timberland Owners' Association in cooperation with the forestry department began the building of a trail and tower and cabin on Haystack Mountain and on Cushman Mountain. In 1918 and again in 1919 every lookout station was occupied by a watchman.

FIRES REPORTED FOR 1918.

Town	Date fire	Duration	Cause	Area burned over Acres	Damage	Expense of fighting	Warden
Brattleboro	Mar. 25	4 hrs.	B. & M. R. R. engine	2.		\$ 1.25	F. R. Thomas
Brattleboro	April 2	1 "	C. V. R. R. engine	.5		3.00	F. R. Thomas
Essex	April 3	4 "	C. V. R. R. engine	6.		6.00	E. A. Martin
Essex	April 5	2 "	C. V. R. R. engine	3.		2.00	E. A. Martin
Pawlet	April 5	11 "	Unknown	100.		21.95	A. W. Brown
Essex	April 6	7 "	Spark from train	3.		4.00	E. A. Martin
Pawlet	April 6	12 "	Burning grass (?)	175.		31.40	A. W. Brown
Essex	April 7	2 "	Spark from engine	1.		2.00	E. A. Martin
Townshend	April 8	6 "	Spark from engine	4.		5.00	R. L. Fitch
Essex	April 11	2 "	Spark from engine	3.		2.00	E. A. Martin
Windsor	April 13	2 "	Burning brush	5.		8.00	E. Anderson
Westminster	April 16	2 "	Burning brush	4.5			Burt Ormsby
Poultney	April 17	8 "	Burning brush	15.	\$ 40.00	4.00	Claire M. Cole
Lunenburg	April 19	4 "	Burning grass	15.	75.00	20.00	Ira Carpenter
Jamaica	April 25	4 "	Spark from train	20.	50.00	10.00	W. A. Newell
Calais	April 26	2 "	Spark from train	10.	10.00		W. A. Newell
Tinmouth	April 26	4 "	Burning brush	1.		4.25	F. L. Warren
Middletown Spgs.	April 27	10 "	Probably dropped match	60.		13.00	Wm. J. Gilmore
Sharon	April 28	3 days	Unknown	30.		19.60	Wm. G. Harrington
West Haven	April 28	36 hrs.	Fishermen	75.	75.00	21.70	I. E. Wilder
Readsboro	April 28	2 days	Burning grass	400.	150.00		B. E. Walker
Shaftsbury	April 28	5 hrs.	Burning grass	100.	70.00	8.40	V. S. Thayer
Andover	April 28	7 "	Unknown	150.	200.00	41.00	E. J. Lyons
Mendon	April 28	3 "	Burning grass	25.	100.00	3.00	C. S. Leonard
Poultney	April 28	24 "	Unknown	25.	500.00	3.00	J. H. Ranger
Arlington	April 28	24 "	Unknown	50.		68.00	C. M. Cole
Rutland	April 28	7 "	Incendiary	50.		15.00	F. H. Farnham
Granville	April 28	48 "	Unknown	1000.	1500.00	121.47	Nels Torkelson
	April 28	1 "	Probably match dropped	.5			H. E. Ford

FIRES REPORTED FOR 1918—(Concluded.)

Town	Date fire	Duration	Cause	Area burned over Acres	Damage	Expense of fighting	Warden
Rockingham.....	April 29	12 hrs.	Unknown	100.		\$11.00	C. R. Hughes
Georgia.....	April 30	5 "	Burning R. R. line	12.	\$ 50.00	25.00	F. O. Pattee
Townshend.....	May 4	1 "	C. V. R. R. engine	2.		3.50	R. L. Fitch
Townshend.....	May 4	1 "	C. V. R. R. engine	4.			R. L. Fitch
Brattleboro.....	May 5	1 day	C. V. R. R. engine	20.		1.00	F. R. Thomas
Townshend.....	May 6	2 hrs.	C. V. R. R. engine	20.	100.00	Pd. by R.R.	R. L. Fitch
Dummerston.....	May 6	3 "	Boys playing with matches	2.			S. S. Washer
Brattleboro.....	May 10	"	B. & M. R. R.	6.	50.00	1.00	F. R. Thomas
Granville.....	May 19	1/2 "	Match dropped	.25			H. E. Ford
Fairfax.....	May 20	2 "	Match dropped	.25			C. Southard
Bloomfield.....	May 28	10 min.	Train	100.		11.25	John Baker
Fair Haven.....	May 28	25 hrs.	Unknown			31.00	E. J. Bigelow
Bloomfield.....	June 15	1/2 "	Train	.13			John Baker
Manchester.....	June 19	8 "	Smokers	25.	30.00	4.00	F. A. Walker
Sutton.....	June 21	4 "	Burning brush	10.	75.00		C. A. Aldrich
Dummerston.....	July 21	7 "	Berry pickers	1.		10.00	W. J. Walker
Rockingham.....	July 31	2 "	Train	3.		13.50	J. B. Woolley
Hubbardton.....	Aug. 2	2 "	Boys Smoking	.5		2.00	L. B. Chandler
Sunderland.....	Aug. 5	4 "	Train	.1			D. C. Stuart
Stockbridge.....	Aug. 14	12 "	Lightning	1.	10.00	3.50	Fred H. Neff
Fair Haven.....	Aug. 16	12 "	Lightning	.5		20.00	E. J. Bigelow
Jamaica.....	Aug. 22	2 "	Smokers	.5	5.00	2.50	W. A. Newell
Brattleboro.....	Nov. 11	1/4 "	Train	.25	5.00	2.00	F. R. Thomas
Brattleboro.....	Nov. 16	"	Train		5.00	2.00	F. R. Thomas

FIRES REPORTED FOR 1919.

Town	Date fire started	Duration	Cause	Area burned over, Acres	Damage	Expense of fighting	Warden
Brattleboro.....	Feb. 4	2 hrs.	B. & M. R. R. engine	2.	\$10.00	\$ 2.00	F. R. Thomas
Brattleboro.....	Feb. 20	3 "	C. V. R. R. engine	2.	10.00	5.25	F. R. Thomas
Sharon.....	April 9	3 "	Match dropped	15.		10.80	J. E. Wilder
Victory.....	April 20	24 "	Unknown	20.	100.00	12.00	O. D. Shores
Plymouth.....	April 22	2 "	Incendiarism	30.	25.00	12.00	B. C. Lynds
Poultney.....	April 27	7 "	Unknown	50.		40.00	W. H. Parker
Brattleboro.....	April 29	1 "	Passing engine	.05		1.35	F. R. Thomas
Lunenburg.....	May 14	3 "	Burning grass	10.			Ira Carpenter
Lunenburg.....	May 15	36 "	Passing engine	25.	300.00	22.55	Ira Carpenter
Island Pond.....	May 16	8 "	Burning brush	30.		6.00	W. H. Hobbs
Barre Route 1.....	May 30	24 "	Children	12.	29.00		D. F. Gregory
Fletcher.....	May 11	11 "	Burning brush	3.		1.25	C. F. Corse
Lunenburg.....	May 17	2 "	Burning grass	15.			Ira Carpenter
Dummerston.....	May 30	4 "	Sparks	10.	25.00	8.20	S. S. Washer
Peacham.....	May 31	9 "	Set	35.		17.00	W. J. Hastie
Brighton.....	June 2	6 "	Fishermen	4.		8.00	W. H. Hobbs
Norton.....	June 2	3/4 "	Burning brush				J. L. Peterson
Dummerston.....	June 3	2 "	R. R. engine sparks	2.	5.00	2.40	S. S. Washer
Waterbury.....	June 5	8 "	Burning brush	50.	750.00	222.00	Philip Shonio
Windham.....	June 5	3/4 "	Smoking	5.			F. H. Carleton
Norton.....	June 18	2 "	Burning brush	.5			J. L. Peterson
Norton.....	June 21	1 "	Burning brush	2.			J. L. Peterson
Ludlow.....	June 22	2 1/2 "	Unknown	30.	90.00	54.41	George H. Wood
Somerset.....	June 26	2 "	R. R. Co.	.75			F. V. Johnson
Sunderland.....	July 2	2 "	Unknown	.5	20.00		D. C. Stuart
Townshend.....	July 3	1 1/2 "	Locomotive	.25			R. W. Snyder
Townshend.....	July 3	4 "	Engine	3.5		1.50	R. W. Snyder
Bridgewater.....	May 15	3 "	Campers	4.	200.00	170.00	L. H. Spaulding
So. Ryegate.....	July 5	72 "	Unknown				O. A. Renfrew

FIRES REPORTED FOR 1919—(Continued.)

Town	Date fire started	Duration	Cause	Area burned over, Acres	Damage.	Expense of fighting	Warden
Essex Jct.....	July 9	5 hrs.	Train	7.		\$ 6.66	E. A. Martin
Norton.....	July 31	2 "	Unknown	.25			J. L. Peterson
Essex Jct.....	July 31	7 days	Unknown	150.		100.00	E. A. Martin
Fletcher.....	May 15	11 hrs.	Burning brush	3.		1.25	C. F. Corse
Jamaica.....	July 3	15 "	Cigarette	.25			W. G. Newell
Averill & Norton.	Aug. 14	2 "	Burning brush	.25			J. L. Peterson
Averill & Norton.	Aug. 18	1 "	Burning brush	.13			J. L. Peterson
Middlebury.....	Aug. 16	6 "	Unknown	4.		6.00	J. W. Kenworthy
Ryegate.....	Aug. 18	10 min.	Unknown			15.00	Lester J. Mills
Averill & Norton.	Aug. 26	2 hrs.	G. T. R. engine	1.			J. L. Peterson
Brownington....	Aug. 18	2 hrs.	Set	1.			J. C. Houston
Brownington....	Aug. 10	2 "	Set	50.	\$500.00	47.70	J. C. Houston
Norton Mills....	Sept. 5		Unknown	50.	400.00		J. L. Peterson
Morgan Ctr.....	Sept. 5		Unknown	45.	400.00		J. L. Peterson
Charleston.....	Sept. 5	7 hrs.	Unknown	1.		40.20	T. G. Gilman
Thetford.....	Aug. 3	3 "	Unknown	.5		25.20	A. E. Allyn
Warners Gore....	Aug. 1	3 "	Lightning			4.80	A. B. Palmer
Norton Mills....	Aug. 12	4 "	Unknown	1.			J. L. Peterson
Norton Mills....	Aug. 4	3 "	Burning brush	.06			J. L. Peterson
Norton Mills....	Aug. 3	3 "	Unknown	.06			J. L. Peterson
Norton Mills....	Aug. 3	3 "	Unknown	.06			J. L. Peterson
North Hero.....	Aug. 3	2 "	Unknown	.06			J. L. Peterson
Middlebury.....	Aug. 8	3 "	Campers	.5			J. L. Peterson
So. Burlington...	Aug. 1	1 day	Unknown	50.		5.00	John Bruley
Hartford.....	Aug. 2	84 hrs.	Brush pile	3.	50.00	50.00	W. S. Heath
Jamaica.....	Aug. 2	2 "	Unknown	.5		46.90	John St. John
Newbury.....	Aug. 2	2 "	R. R. engine	2.	5.00	2.00	W. A. Newell
Castleton.....	Aug. 2	1 "	From a forest fire	.5			O. A. Renfrew
			Lumbering				A. A. Ransom

FIRES REPORTED FOR 1919—(Concluded.)

Town	Date fire started	Duration	Cause	Area burned over, Acres	Damage	Expense of fighting	Warden
Morrisville.....	Aug. 2	1 hrs.	Unknown	.5		\$ 6.00	Silas Chase
Bristol.....	Aug. 2	4 "	Unknown	.06			M. A. Rider
Bennington.....	Aug. 3	2 "	Carelessness	.5		3.50	S. B. Hawkes
Bristol.....	Aug. 4	2 "	Unknown	2.		40.20	M. A. Rider
Charleston.....	Sept. 5	24	Unknown	45.			W. C. Hinton
Averill.....	Sept. 5			.06			J. C. Holmes
Averill.....	Sept. 6		Burning brush	.06			J. C. Holmes
Averill.....	Sept. 6		Unknown	.06			J. C. Holmes
Waterbury.....	July 31						Geo. M. Wood
Essex Jct.....	Aug. 20	3 "	Engine spark	.5		5.00	
Alburgh.....	Sept. 25	6 "		4.		7.00	E. A. Martin
				.06			

Trails:—The past two years has seen no work done in building new trails into the mountains for fire protection or in opening old trails for the same purpose. Since 1910 when the Green Mountain Club Inc. was formed the state of Vermont through its forestry department and the federal government have cooperated with the Club in locating and building many miles of trail along the back bone of the Green Mountain Range. Maintenance of this trail has fallen rather heavily upon the Green Mountain Club. The state and federal governments are not doing their share in this maintenance work. In 1918 and again in 1919 this department attempted to create a formal working plan whereby the four parties most vitally interested, namely the federal government, the state of Vermont, the Green Mountain Club Inc. and the Vermont Timberland Owners' Association, might share equally in a patrol system covering the Long Trail from Canada to Massachusetts. The expense to be borne by each party to the agreement would vary from \$1,200 in years of very low fire hazard to \$2,500 in years of excessive drought. Considerable work has already been done on this project which ultimately will be happily solved.

(b) **Blister rust:**—The disease known in America as the White Pine Blister Rust is an Old World disease originally attacking a native European pine of small importance. The disease was first reported in Europe by H. A. Dietrick in 1856 (Spaulding) and was subsequently extensively studied, particularly during the decade 1890-1900 in Germany, Denmark, Holland, Belgium and England. In those countries the disease had become epidemic on the imported American White Pine (*Pinus Stobous*). This excellent tree, a favorite with many European foresters, is our own white pine and has been extensively planted throughout Europe but is no longer used because of the serious effects of the European disease which thrives much better on the American pine than on its original host. The disease on a number of occasions was imported to America chiefly in 1907-1910 and is now generally established throughout Vermont and is liable to appear at any time in any place where pines are in close proximity to either wild or cultivated currant or gooseberry bushes.

Diseased plantations have been found at Lyndon, Brookfield, Sharon, Woodstock, Hartland, Rutland, Weathersfield, Springfield, Brattleboro, Duxbury and Orange. Native pine infection has been found at Lyndon, Thetford, Ryegate, Barnet, Newbury, Bradford and Royalton. Currant and gooseberry infection can be found at almost any place in the

state where a serious search is made. This does not mean that whole pine stands, either plantations or native growth, will die in a few years. The spread of the disease over a continent may be rapid, but the local spread of the disease until it includes all trees in a stand is comparatively slow. Seldom is the spread of the disease in a stand more rapid than a few additional diseased trees per year to each one hundred healthy trees.

The situation in Vermont is therefore serious but not hopeless, since everywhere there is still time to save the pines by pulling out the currant and gooseberry bushes and thereby absolutely prevent infection of pines now healthy. The attempt at controlling the white pine blister rust disease is becoming less and less a hopeful task, when viewed as a state function looking toward complete eradication of the disease, and is assuming more and more the aspect of a settled fight on the part of the individual owner to control on his own land a fungus disease which, if left alone, will do untold damage to the stand of pine variously estimated up to 10 million dollars in value for the entire state of Vermont.

Policy and scope of activities:—Individual cooperation in blister rust control through ribes eradication has become our settled policy. The state takes the position that it will furnish the supervision of the actual work of ribes eradication if the owner will employ the laborers needed to do the work in the field. With this as our established policy the work of controlling the white pine blister rust disease is progressing under definite, central direction. Such a policy requires that the state shall conduct an active educational program, shall study the spread of the disease, shall keep records of costs and of methods of control, shall make sketch surveys of forest cover for the purpose of locating pine in danger of destruction and shall keep the public acquainted with its findings.

To these ends the forestry department is assigning to its several district foresters, men who are constantly on the move over their respective districts in the interest of forestry, the work of first making detailed surveys, including location, ownership, age, etc., of pine stands in need of protection; second, procuring the cooperation of the owner of pine in ribes eradication; third, supervising the work of ribes eradication while it is in progress and fourth, conducting experiments tending toward a better understanding of the disease and methods of controlling it. The advance work which these district foresters do and the data they gather are of prime importance for upon these data rests

the success of our present state policy. Without this advance work on the part of the district foresters no headway can be made toward economic eradication of ribes nor can intelligent policies be executed.

The attempt to control the white pine blister rust disease began in earnest in 1917 and has, therefore, been under way for four years. During the first two years the above policy was in the process of formation. The subsequent year saw the first concerted effort at controlling the disease outside of experimental areas. In 1917 and 1918 the work of eradication was largely confined to experimental demonstration areas at Thetford and Sharon. In 1918, at Ryegate, an additional area for demonstration purposes was laid out and work of an experimental nature has been conducted on these three areas each year since their establishment. Also work of an experimental nature has been conducted elsewhere.

In the spring of 1919 considerable scouting work was done for the presence of the disease which revealed its location at Waterford, Barnet, Ryegate, Newbury, Bradford, Fairlee, Thetford, East Montpelier, Waitsfield, Sherburne, Enosburg, Castleton, Lincoln, Bristol, East Haven, Waltham, Sharon, Strafford, Mendon, Duxbury and Bloomfield. During 1919 in addition to the work done at the demonstration areas, work of currant and gooseberry eradication was also conducted under the direction of the forestry department on Dr. Webb's estate at Shelburne Farms. During the fall of 1919 considerable effort was made to secure private cooperation in ribes eradication. These efforts were followed up in the spring of 1920 and resulted in cooperative work being done at Enosburg on the Dr. William S. Stevens estate, in Pittsford on lands belonging to the Vermont Sanatorium, the farms of Jesse Billings and E. J. Fox, also on lands belonging to F. C. Partridge in the town of Proctor and the Vermont Marble Company in the town of West Rutland. In addition to this cooperative work the Vermont forestry department eradicated the currant and gooseberry bushes from several of its state forests, including the Charles Downer Forest, the West Rutland Forest, the L. R. Jones Forest. Also some eradication work was done about the state nursery looking eventually toward the reestablishment of the planting of white pine in the state of Vermont.

From July 1, 1918, until May 1, 1920, the field work in blister rust control was under the immediate supervision of Harold L. Bailey. On May 1, 1920, J. E. Riley, Jr., of the

U. S. Department of Agriculture, Bureau of Plant Industry, working in cooperation with the state of Vermont, undertook the supervision of the field work.

The following table illustrates the manner in keeping costs on our experimental eradication work and shows the results of our experimental work as it relates to the cost of ribes eradication. Following this table is a statement of the expenses for the fiscal biennium.

SUMMARY OF ERADICATION DATA FAIRLEE AREA, 1919.

Type	Acres	Cost	Cost per A.	M.hrs.	G'sb'rs	C'r'nts	Ribes per A.
Ia (80% pine 25 yrs. and up)	67.4	49.55	.73	123	1886	322	32
Ic (80% pine 10-25 yrs.)	76.9	32.46	.42	81	660	415	13.7
II (Mixed conifers and H'dws.)	123	84.28	.63	208.42	1164	8806	81
III (Pure Hardwoods)	10.6	4.34	.40	10.75	117	23	12.2
IVpc (Brush Pine)	55.6	40.76	.73	101	257	4182	79
IV (Brush)	95.1	114.52	1.20	283	1644	11893	146
V (Pasture)	181.9	89.71	.49	206.75	2025	1889	21.6
Vpc (Pasture Pine)	66.6	27.99	.42	68.85	745	263	15.1
VI (Cultivated Land)	64.7	6.22	.09	15.5	743	56	12
TOTALS	741.8	449.83		1098.27	9241	27849	

Average cost per acre \$.60.

	1920	1919
H. L. Bailey, salary,	\$ 587.10	\$ 846.21
H. L. Bailey, expenses,	483.40	381.93
Laborers,	3,793.88	1,241.05
Miscellaneous,	328.53	403.11
Total,	\$5,192.91	\$2,872.50

An equal sum was spent in each year by the federal government in blister rust work in the state of Vermont.

STATE FORESTS.

The following is a statement of the location and acreage of the several state forests, also the costs chargeable to maintenance:—

Forest.	Town.	Area.
George Aitken,	Mendon,	800
Arlington,	Arlington,	225
Battell,	Camel's Hump,	4,500
Downer,	Sharon,	800
Groton,	Peacham-Marshfield,	6,000
M. J. Hapgood,	Peru,	100
L. R. Jones,	Plainfield,	600
Lyndon,	Lyndon,	75
Mansfield,	Mt. Mansfield,	5,000
Proctor-Piper,	Cavendish,	400
Putnam,	Worcester,	1,400
Townshend,	Townshend,	700
West Rutland,	West Rutland,	350

COSTS.

	1919	1920	*Cumulative
George Aitken,	\$1,238.49	\$ 601.07	\$ 5,372.32
Arlington,	24.19		2,688.83
Battell,	249.45	177.00	4,132.88
Downer,	372.81	503.47	22,673.29
M. J. Hapgood,			5.99
Groton,	652.06	1,664.82	18,281.03
L. R. Jones,	185.70	145.90	926.01
Lyndon,			2,425.31
Mansfield,	508.92		14,241.93
Proctor-Piper,	212.05		961.74
Putnam,	31.12		350.08
Townshend,	218.33	24.00	6,552.09
West Rutland,	20.00	21.12	2,429.74
State House Grounds,		262.38	262.38
Total,	\$3,713.12	\$3,399.76	\$81,303.62

The Groton Forest:—The Area, which is now termed "The Groton State Forest" was purchased for the state by the Chief Forester from Mr. Mitchell Goslant, of Lanesboro, Vt., in January, 1919. The tract covers about 6,000 acres

*These costs represent all charges against a forest carried forward at 4% compound interest and reduced by the earnings of that forest.

and the purchase price was \$15,000. It lies in Washington and Caledonia Counties, in Marshfield and Peacham townships, on the summit of the divide between the watersheds of the Wells River and the Winooski River, which are Connecticut and Champlain waters respectively. The Montpelier and Wells River R. R. extends northwest to southeast through nearly the midpart of the tract. Lanesboro Post Office, on the railroad, is nearly in the center of the forest, and Edgewater station, on Niggerhead Pond, is just inside the western forest boundary. The area of farm land abandoned for several years, called New Discovery, is included in the purchase. Portions of Peacham Pond, Niggerhead Pond, Osmore (or Hosmer) Pond, and Kettle (or Long) Pond are within the forest.

No part of the tract has been free from lumbering, and since 1872-3, when the railroad first was built, until 1918, when Mr. Goslant closed down his mill at Lanesboro, timber has been cut here nearly every year.

In 1904 or 5 and again in 1908, heavy forest fires ran through the logging slash from the railroad northeasterly for about two miles. Nearly all tree growth which stood in the path of these fires was destroyed.

In the spring of 1920 an intensive forest survey was made of the tract preparatory to placing it under intensive forest management. That is, information was obtained which would enable the state forester to build up here a forest business. The boundaries of the tract were surveyed and marked. Topographic maps were made, an inventory was carefully taken of the timber resources, areas which should be planted to tree seedlings were indicated, and a considerable amount of data gathered regarding the rate of growth of the trees and measures of silviculture feasible of practice.

As a result of 45 years of lumbering (1873-1918) and of the heavy forest fires, the character of the forest has entirely changed from that seen by the early settlers. In the places where stood heavy stands of finest spruce, now we find thick young stands of bird cherry, poplar, yellow birch, red (soft) maple, sugar maple, etc. Excepting the cherry, these species all are of value, and the forest is as a whole well covered with this second growth; but the spruce is practically gone. Yet it is spruce, whether the red or the white or the foreign Norway, that we want on this land. Apparently there is little question that more money can be made by growing conifers than by raising the native hardwoods, and it was one of the purposes of the survey of 1920

to determine how to change back the present forest to a coniferous forest. To do this in the shortest time (for it seems wise to get our land into highest productivity as soon as possible) several forestry measures have been adopted; namely, artificial planting of coniferous seedlings, cutting and selling the hardwoods as they become ripe for cutting, but preserving carefully the native spruce and fir trees in order that they may scatter their seeds over the forest, and protection of the forest against forest fires by a fire warden constantly on duty.

The forest is a bank from which for a hundred years we have steadily drawn capital. The bank was nearly emptied when the state took over its management. It is our task to fill this bank. The plans for doing this are embodied in a report, entitled, "A Working Plan for the Groton State Forest". This plan is a definite, important step taken in placing the forest property under management.

ACCOUNTS.

	1919	1920
Headquarters,	\$ 3,073.82	\$ 3,542.97
Silvical Studies and Reviews,	7.50	922.84
Market and Lumber Statistics,	48.81	
Lectures and Exhibits,	75.00	290.56
Advice to Private Owners,	968.28	820.13
Nursery Inspection or Work,	4,404.59	3,813.52
Inspection, Taxes, Insurance,	1,844.71	693.24
Sales and Uses, Imp. Cuttings,	109.20	174.90
Cruising and Mapping,		494.56
Boundary Surveys,	103.14	43.00
Outplanting,	1,525.92	1,885.31
Perm. Imp.,	130.15	108.75
Fire Prev'n., Detec'n., Extinc'n.,	1,762.79	4,619.01
Disease and Insect Control,	347.35	609.98
	<u>\$14,401.26</u>	<u>\$18,018.77</u>

Recapitulation of the above shows the following distribution of expenses:—

	1919	1920
Salaries,	\$ 5,476.94	\$ 7,102.78
Travel,	1,671.90	2,450.11
Labor,	3,371.23	4,635.22
Tools, Supplies, etc.,	1,758.58	2,679.34
Freight and Ex.,	164.66	161.57
Post and Tel.,	49.10	408.46
Printing,	106.62	97.09
Taxes,	1,754.43	447.35
Insurance,		36.85
Refund,	47.80	
	<u>\$14,401.26</u>	<u>\$18,018.77</u>

Should these figures be compared with those which will probably be submitted by the Auditor of Accounts, it will be noted that the Auditor reports \$7.84 expended in excess of the amount reported above for the fiscal biennium. This is due to the fact that a check, drawn payable to Frank Bourne, of Stratton, was lost and the amount was subsequently paid the second time by the Auditor and both items charged against the forestry account.

REPORT OF STATE FAIR COMMISSION, 1919.

The Thirteenth Annual State Fair was held on the State Fair Grounds September 9-12, 1919, under very unfavorable weather conditions. Nearly every day saw rain; in fact, we had only two days of fair weather, and both of those were very threatening until noon. Notwithstanding the weather, we sold nearly twenty four thousand (24,000) admissions in those two days. On Friday morning, by Government measure, we had three and one-half inches of rain and on Friday noon the Fair was officially declared off for 1919. Had the weather been fair we would have had a record breaking crowd, which means a record breaker financially.

EXHIBITS.

Nearly all the Departments of the Fair were well filled, and the quality was of the best. One exhibit was 430 cattle, including thirty five pairs of oxen and steers, which made a fine showing in that department. The Draft Department was a surprisingly good drawing card. There was very close competition in their classes and the affair was watched by large crowds until the finish. The Dairy breeds showed excellent exhibits in all classes. The Ayrshires were the champions for numbers—over one hundred head of this class alone being exhibited. Excellent beef breeds of Shorthorns, Herfords, and Polled Angus were shown. I believe that these breeds are gaining in popularity among our New England Farmers.

SHEEP.

The sheep were in small numbers for this reason: Several of our exhibits were at Syracuse, and our Maine exhibitors were attending their own State Fair which was held on our dates.

SWINE.

The Swine Department was well filled, and with the best. Nearly one hundred head were exhibited, including a number of Poland China from the well known Black Farm herd of F. W. Burnham of Greenfield, Massachusetts.

HORSES.

The Morgan Horse Club show of Morgans was the best ever, I believe, all things considered. The success of the Morgan Horse Department should be credited to the Secretary of the Club, Mr. C. C. Stillman. To his acquaintance with the breeders of Morgans, and his popularity among them, was in a way due the splendid exhibition of this breed at the Fair. In behalf of the State Fair Commission, I wish to express to Mr. Stillman our appreciation of the very generous specials offered by the members of the M. H. Club.

OTHER BREEDS.

The Standard breeds of horses were not as numerous as we have had. We had a few good ones. There seems to be a scarcity of this breed compared with a few years ago. We had a fine showing of Draft Horses of the Belgium breeding—Percheron, and others. The Connecticut State Farm made a splendid show of a car load of their Percherons, which was a great addition to our exhibition. Aside from these we had several pairs of splendid draft team horses—mostly locals.

While early in the season the racing department looked somewhat discouraging, at Fair time we had a very good entry of race horses, and good racing, as a result of what we had.

POULTRY.

Our poultry department has until this year been open to both large and small exhibitors. By large exhibitors, I mean the so-called string men. We cut out the string men, which reduced the number of our exhibits somewhat; but it gave the local men a chance. I think that this will result in good to the Fair, as well as to our breeders. My judgment is to continue under the same rules as this year.

HORTICULTURAL HALL.

One of the best exhibits we have ever had. Everything was nicely arranged, which added much to the exhibits. Fairly good showing of fruit considering the off year in this part of the country.

MECHANICS' HALL.

Mechanics' Hall and Machinery Buildings were over filled with every kind of machinery that is manufactured to lessen the burdens of mankind. This building drew large crowds of farmers as well as others. The demonstration of different tractors in operation on the Fair Grounds was one of the features which interested the farmer. They plowed and fitted the ground for seeding each day.

FLORAL HALL.

Fully up to the usual exhibition. Always well filled.

BOYS' AND GIRLS' DEPARTMENT.

This department was a new one for the State Fair and proved to be a great success. Much credit should be given Profs. Bradlee and Ingalls. I believe that this year's exhibit was just a stepping stone to a great exhibit of itself for the future years. With high wages and short hours in all our manufacturing plants and railroads, which have a tendency to take young people away from the farms, something has got to be done of this nature to get our young people interested in agriculture or we will soon have less farm help than we now have. We, as a State Fair, ought to encourage this new Department more next year; in fact, our future depends upon these young people. Also, I believe this department is building success for the State Fair. Once get them interested in this Department, worked out by the Fair, and they will always be Fair boosters.

FREE ATTRACTIONS.

Many comments were made upon the clean cut and fine personal appearance of our special attractions. It was hard to get attractions that were new. The aeroplane man did all that he had been advertised to do, and was one of the busiest men on the ground taking up passengers in his machine between his flights for the fair.

PUBLIC SERVICE BUILDING.

Since this building was erected it has been under the management of the Windsor Y. M. C. A., Mr. Hurd, manager. This is one of the greatest assets to our Fair and is being appreciated more and more by the Public each year. People that have not visited this building little realize what is being done for the Public. The work and the expense are not realized, and all for the benefit and pleasure of the Public.

PUBLIC SAFETY DEPARTMENT.

In this department much depends upon the men who are employed. It needs men of judgment to handle the great number of autos that pass through our gates. Not an accident happened through any orders from these men. It is a great record for Frank and his assistants.

TICKET DEPARTMENT.

This department was under the direction of Major Brown of Quechee. Mr. Brown proved himself equal to the management of this important department and to the satisfaction of the officers of the Fair.

THE MIDWAY.

Although one of the largest ever, the income from this Department was below the average. We rented the north end of the Midway to the World's Mirth Show Carnival at a lump sum, not supposing that they would insist upon so large a part of the Midway, which cut down our income from selling space. This Carnival was an experiment which has long been contemplated. Now it has been tried out to the full satisfaction of its agitators. Never, in my opinion, will it be tried again. These Carnival shows have to be watched to keep them within the laws of the State and then they work their game between acts unlawfully. A good Midway is an attraction to the Fair.

FISH EXHIBIT.

The Fish and Game Commissioner, Mr. Leavens, gave us one of the best fish exhibits we have had. They were shipped to the Fair Grounds a few days before the Fair

and were doing well to all appearances until Wednesday A. M. when they all commenced to die. In two hours all were dead. Everything has been done to find out what was the cause, but it is still a mystery. We had the water sent to both Vermont and New Hampshire laboratories. The analysis showed it to be pure and O. K. in every respect. Mr. Leavens had made a great effort in getting this excellent exhibit of the different varieties of Vermont fish together, and to have them die just as the Fair was at its best was somewhat embarrassing for Mr. Leavens. But his courage is good; he is already planning a better exhibit for next year.

AUTO PARK.

We planned for a larger parking ground, so as to be able to take care of the increase in number of cars, which was sure to be needed, and proved to be true. We had ample room for a good many more than we had on the grounds Wednesday. 1,500 machines in the Parks and probably 150 outside the Parks. We had two Parks filled full, and not a car in either Park but could get out at any time. The parking was done very systematically under Superintendent G. H. Miller.

The work assigned to the different Superintendents of the various departments was very satisfactory to the officers. We have practically the same men in most of the departments we have had for several years. That, in my opinion, is why the work is so satisfactory to the public. They are all good men, and by continuing in the work each year have become acquainted with all of the exhibitors of their departments, I believe it is for the best interests of the Fair to continue them in their respective departments.

Mr. C. D. Williams, Superintendent of the Midway for the past several years, has done excellent work each year. I am very sorry to say he handed me his resignation recently. The reason is that he is to be in California during the month of the coming September. We are very sorry to lose Mr. Williams for he is the right man in the right place for the midway.

Mr. H. L. Baldwin has handed me his resignation as Superintendent of Races. He has been in charge of this department during the Fair, since its first meeting. He was a good man for the place. His excuse was that he did not care to be bothered with the work. He wanted to attend the Fair once, without any responsibilities. We lose a good man.

RECAPITULATION OF RECEIPTS AND DISBURSEMENTS BY DEPARTMENTS.

Department.	Dr.	Cr.
Administration,	\$ 3,316.49	\$.05
Ticket,	813.54	17,228.64
Advertising,	2,657.54	
Attraction,	3,113.00	
Auto Parking,	61.40	16.00
Cattle,	4,183.82	425.50
Concession and Privilege,	181.29	3,878.95
Exhibit Expense,	1,332.77	
Floral Hall,	551.01	285.60
Forage,	820.24	935.84
Horses,	3,459.50	160.00
Horticultural Hall,	897.81	52.00
Maintenance,	3,083.59	12.50
Machinery,	10.00	85.00
Personal Property,	50.00	
Miscellaneous Accounts,	837.41	154.10
Permanent Improvements,	641.75	
Poultry,	1,925.25	401.50
Public Safety,	634.99	
Sheep,	846.00	52.50
Special Prizes,		1,980.00
Speed,	3,053.37	1,075.00
State Appropriation,		7,000.00
1918 Account,		2.00
Boys' and Girls' Exhibit,	570.75	
Swine,	348.00	36.50
	<u>\$33,389.52</u>	<u>\$33,781.68</u>
Total Receipts,	\$33,781.68	
Total Disbursements,	33,389.52	
Credit balance,	<u> </u>	\$ 392.16

As shown by Cash Book and Check Book.

I would call to the attention of the Commissioners the fact that there is included in the disbursements the sum of \$797.30 advanced to the so-called Fairground Railway Company for maintenance and repairs. This will not, in all probability, be refunded us.

We drew \$2,000.00 from our accumulated surplus to cover the deficit caused by poor weather. The actual deficit

of the Vermont State Fair is according to these figures \$1,607.84. But taking into consideration the fact that the money advanced the Railway Company should not in reality be charged against our shortage, the deficit would be only \$810.54.

F. L. DAVIS,
Secretary.

1. MOUNTAIN CITY, N. H., 1887.

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\$810.54.

**SUMMARY FOR YEAR 1918 OF DAIRY PRODUCTS
SOLD FROM ALL FACTORIES AND SHIPPING STATIONS.**

Product	Total Pounds	Av. Price	Total Value	Total Lbs. 3.7% Milk	Percentage of all Pro- ducts Sold
Milk Shipped	184,437,425.00	\$3.026	\$5,581,449.02	184,437,425	26.61
Condensed Milk	60,998,746.00	2.966	1,809,266.82	60,998,746	8.80
Cheese	17,458,296.00	2.488	434,050.32	17,458,296	2.52
Sweet Cream Fat	6,678,907.94	.566	3,780,014.11	180,511,019	26.04
Fat in Butter	9,239,257.09	.547	5,057,454.24	249,709,645	36.03
Skimmilk in Mfg. Products	5,925,234.00	.483	28,590.05		
Grand Total		*\$2.408	\$16,690,824.56	693,115,131	100.00

*Average Price Per Cwt.—3.7% Milk.

The total value of all dairy products handled through factories and shipping stations amounts to \$16,690,824.56. The total number pounds of 3.7% milk used in all products handled amounts to 693,115,131 returning an average price of \$2.408 per cwt. to the farmers.

The total milk produced during the year 1918 based on an average production of 4,000 pounds of 3.7% milk per cow annually amounts to 968,608,000 pounds. The total value of milk used in Vermont on the farms as human food, for feeding stock, sold locally and shipped direct through open car, amounts to \$6,633,868.00. The grand total of Vermont dairy industry for 1918 amounts to approximately \$23,324,692.00.

Products	Total Pounds	Average Price (\$)	Total Value (\$)	Total Lbs. 3.7% Milk	Percentage of all Products sold
Milk Shipped	222,754,279	\$3.4298	\$7,639,729.37	222,754,279	28.32
Condensed Milk	75,822,071	3.152	2,390,228.86	75,822,071	9.64
Cheese	36,410,230	2.815	1,024,843.15	36,410,230	4.63
Sweet Cream	7,015,607.20	.663	4,653,621.86	189,610,879	24.10
Skim milk in M'fg. Products	50,496,921	.699	353,021.35		
Fat in Butter	9,694,321.75	.662	6,414,630.64	262,008,701	33.31
Grand Total			\$22,476,075.23	786,606,160	100.00

The total value of all dairy products sold from factories and shipping stations amounts to \$22,476,075.23. The total number pounds of 3.7% milk used in all products handled amounts to 786,606,160 returning an average price of \$2.8574 per cwt. to the farmers.

The total milk produced in 1919 based on average annual production of 4,000 pounds of milk per cow amounts to 931,812,000 pounds. The total value of milk used in Vermont on farms as human food, for feeding stock, sold locally and shipped direct to dealers, amounts to \$4,149,111.00. The grand total of Vermont's dairy industry for year 1919 amounts to approximately \$26,625,186.00.

1919 ABSTRACTS OF RETURNS OF LIVE STOCK AND SILOS.

ADDISON COUNTY.

TOWNS

	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules
Addison.....	62	594	943	1590	1169	24	310	813	
Bridport.....	46	406	1650	1558*		4	381	1481	
Bristol.....	71	388	101	763	71	20	383	863	
Cornwall.....	66	395	1232	967	68	29	227	1018	
Ferrisburg.....	97	897	415	2254	*	10	366	1377	
Goshen.....	5	70	44	182		0	42	118	
Granville.....	25	152	151	322	0	3	68	290	
Hancock.....	13	98	200	136	5	1	30	89	
Leicester.....	†29	†161	†152	†484	1	*	†137	†335	
Lincoln.....	43	292	22	1099	2	9	218	644	
Middlebury.....	49	468	402	47	719	38	245	719	
Monkton.....	52	400	168	1637	*	12	257	637	
New Haven.....	111	434	566	1636	149	36	166	1129	
Orwell.....	58	383	1263	1848	5	31	287	935	
Panton.....	37	266	409	822	17	18	100	462	
Ripton.....	3	116	79	260	*	17	60	143	
Salisbury.....	28	238	334	530	17	16	108	255	
Shoreham.....	51	518	2033	1583	46	21	475	1204	
Starksboro.....	48	332	†55	1644		4	241	912	

ADDISON COUNTY—(Concluded.)

TOWNS	Total Number of Stiles.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules.
Vergennes.....	5	153	1	244 *	†31	4	63	59	2
Waltham.....	33	143	203	520	†31	23	53	233	
Weybridge.....	33	231	210	688	12	12	95	339	
Whiting.....	20	172	526	368	**18	7	86	340	
TOTALS.....	985	7307	11215	21160	2330	337	4398	14395	2

*No returns by listers.

**Listers' returns incomplete.

†Taken from the last previous returns.

BENNINGTON COUNTY.

Arlington.....	11	227	584	419	2	1	122	311	
Bennington.....	46	567	1060	953	†68	11	313	530	
Dorset.....	16	292	231	616	†3	17	142	369	
Glastenbury.....	0	28	0	14	0	0	5	4	
Landgrove.....	1	66	37	139	4	6	42	115	
Manchester.....	24	303	105	668	28	18	178	376	
Peru.....	3	112	33	112	16	2	60	112	
Pownal.....	†39	†288	†713	†817	†160	†16	†156	†798	
Readsboro.....	2	162	2	239	3	6	91	153	

	62	322	292	1452	39	20	161	603
Rupert.....	†13	†153	†467	†293	*		158	†136
Sandgate.....	0	48	16	24	17	1	40	24
Searsburg.....	24	325	1080	550	†47	6	280	476
Shaftsbury.....	10	158	55	369	13	6	40	218
Stamford.....	7	88	177	172	18	4	44	106
Sunderland.....	8	103	38	259	7	5	56	194
Winhall.....	0	58	0	26	0	†2	16	18
Woodford.....								
TOTALS	266	3280	4890	7122	425	121	1784	4541
*No returns by listers.								
†Taken from last previous returns.								

CALEDONIA COUNTY.								
Barnet.....	88	423	1291	1766	115	55	352	1019
Burke.....	7	398	211	957	42	28	284	490
Danville.....	49	203	428	2075	178	49	480	1422
Groton.....	35	154	13	657	†27	13	187	468
Hardwick.....	70	390	131	1651	44	2	370	980
Kirby.....	23	196	199	822	22	25	92	485
Lyndon.....	*	†1233	†537	†939	*		†168	†1260
Newark.....	*	199	72	539	1	7	109	157
Peacham.....	57	339	16	861	†26	29	318	741
Ryegate.....	42	76	100	700	19	18	93	327
Sheffield.....	17	292	111	767	18	12	103	552
St Johnsbury.....	17	283	133	754	38	10	113	536
Stannard.....	11	95	96	259	5	5	45	110
Sutton.....	31	276	122	914	5	3	119	374
Walden.....	14	380	310	1071	28	20	173	494
Waterford.....	40	307	167	1066	27	23	155	307
Wheelock.....	4	375	171	535	33	10	119	290
TOTALS	505	6119	2946	16333	628	309	3280	10012
*No returns by listers.								
†Taken from last previous returns.								

CHITTENDEN COUNTY.

TOWNS

	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules.
Bolton.....	17	125	7	443	22	3	34	109	
Burlington.....	*	†771	†23	†402	*	*	†45	†78	
Charlotte.....	100	586	431	2125	7	19	233	1343	
Colchester.....	66	536	44	1565	11	13	285	2	
Essex.....	59	602	36	2238	22	39	398	872	
Hinesburg.....	66	341	96	1899	†8	9	101	527	
Huntington.....	31	290	0	1236	0	2	207	371	
Jericho.....	84	445	57	2071	10	19	166	705	
Milton.....	†31	636	252	5039	†39	†13	1345	3907	
Richmond.....	50	326	92	1581	71	12	153	698	
Shelburne.....	57	346	251	1282	62	41	178	463	
South Burlington.....	40	364	24	1026	20	28	280	506	
St. George.....	6	44	*	200	*	16	14	75	
Underhill.....	22	395	38	1654	8	12	240	549	
Westford.....	46	342	56	1843	39	34	274	527	
Williston.....	52	396	93	1968	210	31	91	477	
TOTALS.....	726	6545	1500	26572	529	291	4074	11208	

*No returns made by listers.

†Taken from last previous returns.

ESSEX COUNTY

Bloomfield.....	10	117	67	269	0	4	61	208
Brighton.....	0	395	103	584	4	1	193	437
Brunswick.....	†	2	†51	†84	*		†19	†119
Canaan.....	0	349	148	670	1	5	104	352
Concord.....	23	264	141	977	8	33	93	572
East Haven.....	*	†76	†32	†206	*	†2	†25	†136
Granby.....	4	59	25	94	0	3	13	84
Guildhall.....	14	231	50	352	11	3	59	249
Lemington.....	10	70	99	170	2	2	34	173
Lunenburg.....	†18	332	202	1026	39	16	144	766
Maidstone.....	*	†89	†102	†206	*		†42	†83
Norton.....	†2	†117	†60	†259	*	†2	†28	†226
Victory.....	3	70	8	119	0	1	16	110
TOTALS.....	86	2220	1127	5424	65	72	831	3515

*No returns made by listers.

†Taken from the last previous returns.

FRANKLIN COUNTY.

Bakersfield.....	22	433	147	1724	38	18	184	687
Berkshire.....	48	409	*81	2795	75	54	275	784
Enosburg.....	†52	†608	*	†3590	*		†553	†998
Fairfax.....	*	†513	†45	†2255	*		†387	†807
Fairfield.....	70	504	163	3430	18	28	290	1173
Fletcher.....	19	202	47	1188	12	19	220	399
Franklin.....	19	314	179	1845	20	30	382	463
Georgia.....	68	414	253	1858	96	26	167	558
Highgate.....	46	670	137	1875	12	2	348	918
Montgomery**	12	80	1	467	10	3	61	162
Richford.....	29	440	118	1552	8	8	272	616
Sheldon**.....	28	316	54	1890	25	12	142	469

LAMOILLE COUNTY.

Belvidere.....	19	108	13	296	0	0	40	118
Cambridge.....	61	605	118	2565	116	67	577	850
Eden.....	5	307	166	919	*	4	132	341
Elmore.....	136	1203	145	1728	1596	† 6	1148	139
Hyde Park.....	25	453	124	1236	75	19	379	654
Johnson.....	157	1413	168	1549	154	121	1192	1276
Morris town.....	69	759	254	2689	169	35	379	1042
Stowe.....	88	651	376	2672	161	30	414	841
Waterville.....	13	64	68	343	6	0	162	134
Wolcott.....	24	370	166	924	15	9	176	830
TOTALS.....	387	3933	1398	12921	1192	191	2569	5125

*No returns made by listers.

†Taken from last previous returns.

ORANGE COUNTY.

Bradford.....	76	458	338	905	25	15	209	616
Braintree.....	72	315	428	865	119	9	107	546
Brookfield.....	134	498	167	1487	16	17	312	1082
Chelsea.....	63	353	435	950	18	39	194	765
Corinth.....	39	386	319	868	17	11	197	814
Fairlee.....	25	172	142	361	36	8	111	270
Newbury.....	106	637	881	1985	125	49	332	1518
Orange.....	34	230	134	623	69	15	136	401
Randolph.....	234	823	403	2549	208	19	539	1634
Strafford.....	49	301	243	788	19	12	175	618
Thetford.....	46	375	374	1366	41	44	134	631
Topsham.....	46	358	194	976	108	24	221	671
Tunbridge.....	129	306	429	1235	36	24	325	930
Vershire.....	29	167	416	423	*	4	82	373

ORANGE COUNTY—(Continued.)

TOWNS	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules.
Washington.....	†27	†268	†146	†533	†17	†9	†195	†619	
West Fairlee.....	16	164	137	340	5	4	99	384	
Williamstown.....	68	475	214	1376	1010	70	342	1010	
TOTALS.....	1193	6284	5400	17630	1759	373	3710	12882	

*No returns made by listers.

†Taken from last previous returns.

ORLEANS COUNTY.

Albany.....	34	355	165	1709	50	35	198	625	
Barton.....	27	698	470	2149	76	36	332	612	
Brownington.....	16	305	172	1098	4	1	173	437	
Charleston.....	32	360	284	1248	35	20	235	805	
Coventry.....	23	327	389	1561	2	2	133	525	
Craftsbury.....	55	510	133	1894	114	23	293	836	
Derby.....	*	†999	†189	†2567	*		†652	†1077	
Glover.....	38	395	433	1755	37	38	308	630	
Greensboro.....	8	417	137	1485	212	48	275	597	
Holland.....	10	380	198	1308	4	5	205	454	

Irasburg.....	18	415	257	2073	22	6	273	766
Jay.....	11	163	4	684	1	1	87	245
Lowell.....	†25	†425	†116	†1126	*	*	†240	†807
Morgan.....	6	256	119	811	*	2	113	484
Newport City.....	†13	†368	†184	362	*	†2	192	†184
Newport Town.....	30	483	330	2748		7	197	749
Troy.....	†26	†418	†39	†1924	25	†10	†252	†650
Westfield.....	20	264	75	1200	†19	6	250	323
Westmore.....	121	126	179	491	41	9	64	255
TOTALS.....	513	7664	3873	28193	660	251	4367	11061

*No returns made by listers.

†Taken from last previous returns.

RUTLAND COUNTY.

Benson.....	48	322	1186	1285	13	13	208	596
Brandon.....	37	424	113	987	10	35	175	628
Castleton.....	32	278	27	793	20	11	98	415
Chittenden.....	28	203	113	575	*	*	93	329
Clarendon.....	31	175	119	655	71	24	98	335
Danby.....	51	320	53	1165	†10	21	146	772
Fair Haven.....	20	227	20	260	15	5	48	132
Hubbardton.....	37	88	648	570	11	12	133	339
Ira.....	10	131	64	370	20	6	134	332
Mendon.....	11	48	11	121	0	10	26	129
Middletown Springs.....	19	223	131	754	64	16	92	385
Mount Holly.....	†17	†330	†28	†1205	†13	†32	†205	†502
Mount Tabor.....	0	32	0	51	0	4	7	24
Pawlet.....	90	298	102	1792	84	58	177	584

RUTLAND COUNTY—(Concluded.)

TOWNS

	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules.
Pittsfield.....	24	108	72	245	4	4	63	270	
Pittsford.....	72	414	193	**1865	†108	73	248	†1230	
Poultney.....	37	523	163	1440	117	8	249	727	
Proctor.....	6	113	0	256	61	9	69	120	
Rutland City.....	16	468	162	547	47	6	161	9	14
Rutland Town.....	50	308	262	1174	30	29	221	617	
Sherburne.....	19	129	193	257	11	3	54	274	
Shrewsbury.....	57	283	204	1115	51	24	217	473	
Sudbury.....	33	221	769	663	7	8	180	406	
Tinmouth.....	16	188	51	824	200	18	145	425	
Wallingford.....	19	253	367	1115	17	18	169	591	
Wells.....	31	141	82	556	14	1	73	193	
West Haven.....	33	229	537	720	†18	9	131	478	
West Rutland.....	15	221	143	708	†92	1	219	300	
TOTALS.....	859	6697	5803	22068	1098	458	3839	11615	14

*No returns by listers.

**This includes the young stock.

†Taken from last previous returns.

WASHINGTON COUNTY.

Barre City.....	1	280	2	247	10	6	54	67
Barre Town.....	60	315	20	1120	210	29	260	1870
Berlin.....	55	398	114	1313	68	28	294	730
Cabot.....	49	469	165	1501	178	42	345	1116
Calais.....	86	445	64	1455	128	33	287	690
Duxbury.....	†41	†216	†20	†661	†3	†3	†345	†436
East Montpelier.....	74	391	275	1746	26	21	524	926
Fayston.....	39	161	10	469	7	8	99	275
Marshfield.....	62	369	325	1197	67	25	296	795
Middlesex.....	48	329	71	1143	68	20	302	609
Montpelier.....	8	407	2	567	†38	†7	203	222
Moretown.....	52	368	46	973	34	24	230	727
Northfield.....	60	325	250	1100	65	20	310	640
Plainfield.....	44	261	182	909	36	20	126	456
Roxbury.....	39	264	197	625	*	3	153	403
Waitsfield.....	50	288	71	1128	60	42	268	723
Warren.....	45	243	43	647	10	31	133	530
Waterbury.....	95	490	69	1890	89	26	265	1083
Woodbury.....	20	209	15	604	28	8	122	275
Worcester.....	9	190	14	468	27	6	134	236
TOTALS.....	937	6418	1955	19733	1152	402	4750	11809

*No returns made by listers.

†Taken from last previous returns.

WINDHAM COUNTY.

Athens.....	14	64	1	142	10	11	26	162
Brattleboro.....	70	519	276	697	346	26	277	639
Brookline.....	21	71	80	187	7	7	54	313
Dover.....	9	169	252	224	†2	2	101	365
Dummerston.....	42	241	155	649	54	11	137	454
Grafton.....	17	189	181	290	0	8	81	361
Guilford.....	40	248	63	611	6	8	160	595

WINDHAM COUNTY—(Concluded.)

TOWNS

	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules.
Halifax.....	15	186	109	357	*	3	49	264	
Jamaica.....	16	244	122	321	30	2	124	315	
Londonderry.....	36	319	152	714	53	16	129	418	
Marlboro.....	15	118	212	238	10	5	84	391	
Newfane.....	34	180	109	381	45	14	124	361	
Putney.....	†44	†177	†238	†542	†150	†10	†55	†404	
Rockingham.....	24	442	313	784	170	16	359	652	
Somerset.....	0	54	0	1	0	0	30	0	
Stratton.....	0	59	6	36	0	1	11	37	
Townshend.....	20	263	141	504	0	0	109	578	
Vernon.....	68	169	2	544	127	23	127	195	
Wardsboro.....	16	126	135	272	9	10	87	282	
Westminster.....	45	399	459	847	98	21	183	769	
Whitingham.....	99	351	351	606	32	9	166	668	
Wilmington.....	28	363	612	772	87	17	256	1020	
Windham.....	12	134	79	244	28	25	64	201	
TOTALS.....	685	5022	4048	9863	1264	245	2793	9444	

*No returns made by listers.

†Taken from last previous returns.

WINDSOR COUNTY.

Andover.....	149	29	435	*	*	†1	79	278
Baltimore.....	†5	†32	†78	*	†2	†1	†23	†64
Barnard.....	68	351	795		84	24	222	485
Bethel.....	55	363	1028		3	2	236	687
Bridgewater.....	19	133	290	*		6	89	299
Cavendish.....	19	181	310			10	102	292
Chester.....	†28	†383	†244		40	†7	†201	†843
Hartford.....	*	642	734	*	†70		608	805
Hartland.....	*	†525	†441	*	205		†338	†880
Ludlow.....	37	155	383		79	29	55	214
Norwich.....	53	429	853		80	43	221	858
Plymouth.....	6	156	447		16	9	79	203
Pomfret.....	68	266	172		456	60	129	384
Reading.....	*	†170	†266	*			†152	†335
Rochester.....	63	347	833		18	11	226	625
Royalton.....	97	506	1179		107	20	467	965
Sharon.....	40	212	504		7	8	157	381
Springfield.....	88	681	192	*			398	1082
Stockbridge.....	*	†192	†206	*			†215	†284
Weathersfield.....	*	†346	†168	*			†218	†753
Weston.....	22	168	562		4	6	128	228
West Windsor.....	45	261	193		169	21	110	345
Windsor.....	32	303	149		167	11	217	267
Woodstock.....	50	667	1243		21	49	304	853
TOTALS.....	795	7562	6250	18242	1521	328	4974	12420

*No return made by listers.

†Taken from last previous returns.

SUMMARY BY COUNTIES.

COUNTIES

	Total Number of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Registered Neat Stock.	Total No. of Pure Bred Bulls.	Total No. of Hogs.	Total No. of Other Neat Stock.	Total No. of Mules
Addison.....	985	7307	11215	21160	2330	337	4398	14395	2
Bennington.....	266	3280	4890	7122	425	121	1784	4541	2
Caledonia.....	505	6119	2946	16333	628	309	3280	10012	
Chittenden.....	726	6545	1500	26572	529	291	4074	11208	
Essex.....	86	2220	1127	5424	65	72	831	3515	
Franklin.....	580	6195	1507	27994	591	275	3988	9564	
Grand Isle.....	155	1680	1796	3903	88	41	823	1218	
Lamoille.....	387	3933	1398	12921	1192	191	2599	5125	
Orange.....	1193	6284	5400	17630	1759	373	3710	12882	
Orleans.....	513	7664	3873	28193	660	251	4367	11061	
Rutland.....	859	6697	5803	22088	1098	458	3839	11615	14
Washington.....	937	6418	1955	19733	1152	402	4750	11809	
Windham.....	685	5022	4043	9863	1264	245	2793	9444	
Windsor.....	795	7562	6250	18242	1521	328	4974	12420	
TOTALS.....	8672	76926	53708	237158	13302	3694	46210	128909	18

1920 ABSTRACTS OF RETURNS OF LIVE STOCK AND SILOS.

ADDISON COUNTY.

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.
Addison.....	68	580	985	1706	1031	22	24	35
Bridport.....	19	262	748	820	549	*	*4	215
Bristol.....	66	483	113	935	870	85	21	317
Cornwall.....	63	406	998	985	1039	97	27	210
Ferrisburg.....	66	769	83	2182	1417	5	*1	319
Goshen.....	8	77	52	184	118	*	*	48
Granville.....	26	149	168	281	261	*	4	36
Hancock.....	9	144	144	174	102	3	2	49
Leicester.....	29	182	417	648	414	1	1	95
Lincoln.....	31	251	20	710	391	1	*10	197
Middlebury.....	*49	*468	*402	*47	*719	*719	*38	*245
Monkton.....	43	322	163	1744	544	28	27	265
New Haven.....	111	515	525	1675	862	141	75	234
Orwell.....	76	415	1324	1959	939	38	32	370
Panton.....	36	264	378	866	353	20	20	102
Ripton.....	4	103	42	247	125	*	2	59
Salisbury.....	24	119	194	562	197	26	8	82

ADDISON COUNTY—(Concluded)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.
Shoreham.....	54	660	1633	1765	1199	58	32	573
Starksboro.....	*48	*332	*53	*1644	*4912	*	4	*241
Vergennes.....	6	151	1	221	50	36	7	61
Waltham.....	30	118	86	503	254	50	6	37
Weybridge.....	42	246	295	771	386	*12	*12	126
Whiting.....	28	194	577	354	412	10	9	69
TOTALS.....	839	6347	8946	19192	11513	620	297	3499
*Taken from the last Returns from said town.	936	7147	9401	20883	17144	1352	366	3985

BENNINGTON COUNTY.

Arlington.....	15	249	488	453	329	*2	*1	141
Bennington.....	51	595	1212	990	555	2	9	369
Dorset.....	10	307	215	744	492	*3	42	120
Glastenbury.....	*	25	*	15	11	*	*	7
Landgrove.....	*1	71	39	129	92	4	1	40

Manchester.....	14	419	109	797	555	*28	43	212
Peru.....	3	124	36	158	115	30	4	90
Pownal.....	49	364	827	1099	688	15	12	259
Readsboro.....	*2	155	*2	242	187	10	*6	93
Rupert.....	64	339	343	1595	605	155	21	171
Sandgate.....	11	144	511	249	121	*	3	52
Searsburg.....		60	22	39	38	23	2	39
Shafsbury.....	16	485	1479	861	598	*	16	348
Stamford.....	16	146	8	314	177	13	*6	47
Sunderland.....	5	96	179	202	99	11	7	59
Winhall.....	8	179	33	223	135	9	*5	147
Woodford.....	*	71	*	27	18	*	*2	31
TOTALS.....	262	3829	5501	8137	4815	272	160	2225
*Taken from the last Returns from said town.....	265	3829	5503	8137	4815	305	180	2225

CALEDONIA COUNTY

Barnet.....	93	509	117	1683	1100	226	53	372
Burke.....	10	394	194	1061	526	23	15	311
Danville.....	33	719	433	2121	1377	311	52	461
Groton.....	35	154	13	667	468	*27	13	187
Hardwick.....	55	589	204	1680	846	22	10	452
Kirby.....	24	200	188	761	388	*22	13	79
Lyndon.....	*	*538	*481	*1490	*947	*	*	*513
Newark.....	*	200	87	397	288	*	*	98
Peacham.....	60	324	25	1176	630	12	24	322
Ryegate.....	69	474	213	1831	1062	75	49	239
Sheffield.....	22	207	109	813	560	38	20	118
St Johnsbury.....	14	696	182	1451	749	181	34	229
Stannard.....	10	105	125	218	132	*5	6	91
Sutton.....	16	193	47	721	352	10	5	124
Walden.....	14	*380	*310	*1071	*494	*28	*20	*173

CALEDONIA COUNTY—(Concluded.)

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Purebred Bulls.	Total No. of Hogs.
Waterford.....	41	352	238	1227	573	10	20	216
Wheelock.....	7	279	148	503	314	70	9	91
TOTALS.....	489	5395	2323	16300	9365	978	323	3390
*Taken from the last Returns from said town.....	503	6313	3114	16861	10803	1060	3434	376

CHITTENDEN COUNTY.

Bolton.....	17	125	7	443	109	22	3	44
Burlington.....	*	490	64	394	95	*	*	101
Charlotte.....	101	662	338	2006	1151	138	46	202
Colchester.....	80	532	48	1704	588	9	9	228
Essex.....	63	502	47	2306	789	75	46	478
Hinesburg.....	66	697	83	2393	708	12	9	94
Huntington.....	33	282	*0	1056	392	*	*2	152
Jericho.....	89	430	57	2172	598	45	19	149
Milton.....	*31	*636	*252	*5039	*3907	*39	*13	*1345
Richmond.....	50	352	92	2786	887	461	2	76

Shelburne.....	61	369	250	1428	422	44	32	106
South Burlington.....	46	319	22	1067	493	27	22	284
St George.....	4	42	*	213	102	*	2	11
Underhill.....	14	355	22	1810	597	*8	*12	279
Westford.....	46	370	40	1900	545	48	30	235
Williston.....	14	154	*93	772	147	76	19	8
TOTALS.....	694	5681	973	22450	7623	957	239	2447
*Taken from the last Returns from said town.....	715	6317	1415	27499	11530	1004	266	3792

ESSEX COUNTY.

Bloomfield.....	10	138	77	298	148	14	3	55
Brighton.....		301	103	594	345	14	1	164
Brunswick.....	*2	*51	*90	*84	*119	*	*	*19
Canaan.....	4	311	136	718	358	6	4	96
Concord.....	19	397	151	985	658	15	39	147
East Haven.....		66	12	128	3	3	15	107
Granby.....	2	60	27	100	83	1	2	21
Guildhall.....	16	200	65	444	214	12	5	94
Lemington.....	9	83	65	277	111	*2	*2	23
Lunenburg.....	*	*332	*202	*1026	*766	*39	*16	*144
Maidstone.....	*	*	*	*	*	*	*	*
Norton.....	*2	*58	*	*164	*108	*	*	*18
Victory.....	2	69	2	108	73	*	*1	23
TOTALS.....	62	1625	638	3642	1993	65	71	733
*Taken from the last Returns from said town.....	66	2066	930	4916	2984	103	88	914

FRANKLIN COUNTY.

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Bulls.	Total No. of Hogs.
Bakersfield.....	30	445	116	1819	812	59	28	183
Berkshire.....	51	523	878	3038	783	43	30	389
Enosburg.....	60	653	79	3347	1003	265	46	472
Fairfax.....	64	497	27	2364	718	*	*	317
Fairfield.....	32	457	148	2602	624	21	13	130
Fletcher.....	28	331	133	1278	504	3	9	222
Franklin.....	30	383	225	2038	640	33	31	531
Georgia.....	54	431	210	1845	535	87	23	141
Highgate.....	50	531	160	1597	670	12	*2	305
Montgomery.....	60	372	63	2125	670	7	11	347
Richford.....	29	440	73	1746	657	11	6	242
Sheldon.....	47	303	114	2515	612	142	32	283
St. Albans City.....	*	78	*	28	*	*	*	52
St. Albans Town.....	71	585	152	1697	952	76	24	33
Swanton.....	81	591	60	1315	499	120	37	272
TOTALS.....	687	6620	2438	23354	9679	879	290	4109
*Taken from the last Returns from said town.....	687	6620	2438	23354	9679	879	292	4109

GRAND ISLE COUNTY.

Alburg.....	31	622	224	1292	349	1	4	185
Grand Isle.....	53	371	482	987	276	15	*12	177
Isle La Motte.....	5	180	93	366	179	9	2	52
North Hero.....	21	267	429	583	109	20	17	114
South Hero.....	50	318	384	759	365	25	10	128
TOTALS.....	160	1758	1612	3987	1278	70	33	654
*Taken from the last Returns from said town.....	160	1758	1612	3987	1278	70	45	654

LAMOILLE COUNTY.

Belvidere.....	10	77	11	298	112	*	*	43
Cambridge.....	82	634	124	2811	908	90	75	612
Eden.....	4	307	156	929	335	*	*4	143
Elmore.....	*36	*203	*45	*728	*635	*	*6	*148
Hyde Park.....	42	492	138	1858	655	42	13	272
Johnson.....	63	333	84	1035	380	82	14	264
Morristown.....	85	774	323	2783	917	191	64	418
Stowe.....	57	646	340	2735	868	244	39	396
Waterville.....	12	162	93	366	188	*6	*	91
Wolcott.....	14	363	117	1585	391	38	16	292
TOTALS.....	369	3788	1386	14400	4754	687	221	2531
*Taken from the last Returns from said town.....	405	3991	1431	15128	5389	693	231	2679

ORANGE COUNTY

TOWNS	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Bulls.	Total No. of Hogs.
Bradford.....	76	433	348	1037	569	95	10	306
Braintree.....	64	330	347	980	512	15	23	177
Brookfield.....	133	470	249	1607	1095	94	12	457
Chelsea.....	*63	*353	*435	*950	*765	*18	*39	*194
Corinth.....	52	440	248	768	726	49	18	232
Fairlee.....	23	189	157	408	168	36	4	121
Newbury.....	96	582	818	2068	1454	225	55	291
Orange.....	24	244	119	567	391	74	13	187
Randolph.....	235	819	406	2743	1533	204	*19	641
Strafford.....	45	306	251	823	630	54	21	214
Thetford.....	44	364	327	1071	778	59	23	197
Topsham.....	41	455	206	944	736	151	54	258
Tunbridge.....	144	345	438	1286	1043	131	35	386
Vershire.....	29	186	238	389	332	38	3	137
Washington.....	37	312	141	701	461	6	10	206
West Fairlee.....	18	157	97	238	303	2	4	84
Williamstown.....	*68	*475	*214	*1376	*1010	*1010	*70	*342
TOTALS.....	1061	5632	4390	15630	10731	1233	285	3894
*Taken from the last Returns from said town	1192	6460	5039	17956	12506	2261	413	4430

ORLEANS COUNTY.

Albany.....	47	407	129	1881	756	76	24	282
Barton.....	38	609	370	2291	541	37	30	273
Brownington.....	*16	396	251	1421	486	7	2	234
Charleston.....	25	420	271	1459	808	57	23	343
Coventry.....	*23	*327	*389	*1561	*525	*2	*2	*133
Craftsbury.....	45	439	126	1567	563	161	39	289
Derby.....	77	783	182	2728	1305	213	38	382
Glover.....	36	379	215	1727	559	109	85	280
Greensboro.....	24	451	210	1594	752	70	36	340
Holland.....	3	397	241	1508	466	2	4	205
Irasburg.....	18	439	255	2265	713	35	9	315
Jay.....	9	171	16	755	287	*1	*2	113
Lowell.....	*25	414	221	1319	750	*	*	239
Morgan.....	8	143	78	700	331	28	5	70
Newport City.....	10	366	58	380	105	16	5	121
Newport Town.....	32	511	331	2631	638	35	5	139
Troy.....	*26	*418	*	*1924	*650	*19	*10	*252
Westfield.....	25	275	100	1100	*323	325	15	275
Westmore.....	12	126	179	485	175	40	10	64
TOTALS	409	6816	3233	25811	9235	1211	282	3964
*Taken from the last Returns from said town	499	7561	3622	29296	10735	1233	294	4349

RUTLAND COUNTY.

Benson.....	50	307	1133	1151	720	45	14	257
Brandon.....	57	405	158	1178	770	44	29	195
Castleton.....	33	289	37	473	277	2	22	138
Chittenden.....	23	198	130	504	309	*	2	129
Clarendon.....	59	343	466	825	804	108	46	190
Danby.....	51	397	82	1124	904	1	7	213
Fair Haven.....	26	231	24	433	188	30	3	69
Hubbardton.....	39	214	565	701	171	*11	31	103
Ira.....	12	139	80	378	307	99	5	96

RUTLAND COUNTY—(Concluded.)

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat	Total No. of Registered	Total No. of Purebred	Total No. of Hogs.
Mendon.....	11	117	11	272	159	*	2	90
Middletown Springs.....	*19	*223	*131	*754	*385	*84	*16	*92
Mount Holly.....	12	336	47	1243	327	12	35	218
Mount Tabor.....	*	28	*	53	31	*	*4	1
Pawlet.....	91	372	47	2008	509	118	20	311
Pittsfield.....	15	127	71	298	182	9	4	65
Pittsford.....	*72	*414	*193	*1865	*1230	*108	*73	*248
Poultney.....	52	470	133	1532	604	177	20	250
Proctor.....	6	102	*	255	124	80	6	35
Rutland City.....	15	347	166	471	146	49	6	88
Rutland Town.....	*50	*308	*262	*1174	*617	*30	*29	*221
Shelburne.....	10	127	170	270	195	2	1	27
Shrewsbury.....	58	269	273	1196	429	68	24	192
Sudbury.....	32	215	593	651	391	4	5	149
Tinmouth.....	18	213	61	917	395	133	26	181
Wallingford.....	48	333	289	1209	718	37	14	188
Wells.....	43	197	75	816	202	30	13	116
West Haven.....	33	221	511	789	*1327	15	15	131
West Rutland.....	10	185	117	656	248	9	2	111
TOTALS	802	6182	5239	19403	9110	1072	352	3543
*Taken from the last Returns from said town	943	7127	5825	23196	12669	1285	474	4104

WASHINGTON COUNTY.

Barre City.....	2	349	*2	276	51	18	7	31
Barre Town.....	*60	*315	*20	*1120	*330	*210	*29	*260
Berlin.....	56	430	82	1348	787	91	24	290
Cabot.....	46	484	131	1845	1260	170	34	518
Calais.....	92	430	35	1251	568	137	39	358
Duxbury.....	36	215	27	655	304	19	9	397
East Montpelier.....	74	391	275	1746	926	26	21	524
Fayston.....	*39	*161	*10	*469	*275	*7	8	*99
Marshfield.....	73	416	669	1374	906	71	37	317
Middlesex.....	54	337	69	1142	629	63	17	275
Montpelier.....	18	436	23	565	230	68	15	202
Moretown.....	59	330	45	988	634	105	23	266
Northfield.....	60	356	196	842	612	63	35	325
Plainfield.....	38	262	116	785	433	16	4	206
Roxbury.....	30	219	139	545	182	24	10	93
Waitsfield.....	57	326	98	1105	862	44	39	285
Warren.....	27	252	62	682	648	11	20	252
Waterbury.....	78	616	65	2056	905	383	21	281
Woodbury.....	30	259	48	600	303	33	10	108
Worcester.....	14	198	50	467	297	8	8	161
TOTALS	844	6306	2130	25580	10537	1350	373	4889
*Taken from the last Returns from said town	943	6782	2162	19861	11142	1567	410	5248

WINDHAM COUNTY.

Athens.....	14	57	3	128	150	*10	5	18
Brattleboro.....	66	449	306	788	645	219	28	250
Brookline.....	22	67	103	172	218	28	9	84
Dover.....	13	198	284	285	348	3	2	84
Dummerston.....	34	206	80	521	469	28	10	163

WINDHAM COUNTY—(Concluded.)

TOWNS

	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Bulls.	Total No. of Purebred Bulls.	Total No. of Hogs.
Grafton.....	22	186	150	344	344	*54	4	84
Guilford.....	51	289	76	689	647	95	17	157
Halifax.....	23	183	266	386	363	14	7	114
Jamaica.....	*16	*244	*122	*321	*315	*30	*2	*124
Londonderry.....	36	374	246	721	520	33	33	190
Marlboro.....	20	123	172	194	395	35	6	64
Newfane.....	34	198	135	406	319	37	9	152
Putney.....	*44	*177	*	*542	*842	*150	*10	*55
Rockingham.....	27	418	353	805	712	*170	58	285
Somerset.....	*	48	*	1	*	*1	*	26
Stratton.....	*	*59	*6	*36	*37	*	*1	*11
Townshend.....	*20	*263	*141	*504	*578	*	*	*109
Vernon.....	53	165	3	518	303	146	16	139
Wardsboro.....	17	140	157	266	316	11	5	66
Westminster.....	*45	*399	*459	*847	*769	*98	*21	*183
Whitingham.....	29	281	401	681	613	103	19	156
Wilmington.....	32	345	577	803	917	75	15	191
Windham.....	14	141	116	228	157	9	10	84
TOTALS.....	507	3868	3428	7936	7436	836	253	2307
*Taken from the last Returns from said town	632	5010	4156	10186	9777	1349	270	2789

WINDSOR COUNTY.

Andover.....	26	152	91	449	259	*	5	1	71
Baltimore.....	5	38	69	95	93			5	17
Barnard.....	68	280	225	829	460		65	10	220
Bethel.....	66	355	220	1015	690		35	*2	240
Bridgewater.....	30	250	378	530	525		12	6	155
Cavendish.....	*19	*181	*307	*310	*292		*40	*10	*102
Chester.....	36	359	241	673	769		5	9	181
Hartford.....	20	583	437	1415	869		165	32	574
Hartland.....	*		*	*	*		*	*	*
Ludlow.....	31	351	152	646	336		132	8	127
Norwich.....	65	455	389	955	851		89	17	261
Plymouth.....	3	121	61	266	233		2	2	46
Pomfret.....	34	122	319	414	396		210	23	140
Reading.....	*	*	*	*	*		*	*	*
Rochester.....	64	432	792	827	578		46	15	248
Royalton.....	119	497	167	1276	915		168	29	375
Sharon.....	55	225	202	593	490		49	18	215
Springfield.....	89	677	211	1418	1011		64	15	298
Stockbridge.....	42	246	209	470	330		4	4	198
Weathersfield.....	*	*	*	*	*		*	*	*
Weston.....	24	200	124	564	401		2	3	108
West Windsor.....	31	165	159	491	473		61	13	54
Windsor.....	37	294	91	529	346		*167	18	88
Woodstock.....	50	715	849	1118	885		36	57	440
TOTALS	885	6517	5386	14572	10910		1150	285	4056
*Taken from the last Returns from said town.	904	6698	5693	14885	11200		1357	297	4158

SUMMARY BY COUNTIES.

COUNTIES	Total No. of Silos.	Total No. of Horses.	Total No. of Sheep.	Total No. of Milch Cows.	Total No. of Other Neat Stock.	Total No. of Registered Neat Stock.	Total No. of Bulls.	Total No. of Hogs.
Addison.....	839	6347	8946	19192	11513	620	297	3499
Bennington.....	262	3829	5501	8137	4815	272	160	2225
Caledonia.....	489	5395	2323	16300	9365	978	323	3390
Chittenden.....	684	5681	978	22450	7623	957	239	2447
Essex.....	62	1625	638	3642	1993	65	71	733
Franklin.....	687	6620	2438	28354	9679	879	280	4109
Grand Isle.....	160	1758	1612	3987	1278	70	33	654
Lamoille.....	369	3788	1386	14400	4754	687	221	2531
Orange.....	1061	5632	4390	15630	10731	1233	285	3894
Orleans.....	409	6816	3233	25811	9235	1211	282	3964
Rutland.....	802	6182	5239	19403	9110	1072	352	3543
Washington.....	844	6306	2130	25580	10537	1350	373	4889
Windham.....	507	3868	3428	7936	7436	836	253	2307
Windsor.....	885	6517	5386	14572	10910	1150	285	4056
TOTALS.....	8060	70364	47628	226394	108979	11380	3464	42241

SUMMARY BY COUNTIES.

Addison.....	936	7147	9401	20883	1714	1352	366	3985
Bennington.....	265	3829	5503	8137	4815	305	180	2225
Caledonia.....	503	6313	3114	18861	10806	1060	343	4376
Chittenden.....	715	6317	1415	27480	11530	1004	266	3792
Essex.....	66	2066	980	4916	2984	106	88	914
Franklin.....	687	6620	2438	29354	9679	879	292	4109
Grand Isle.....	160	1758	1612	3987	1278	70	45	654
Lamoille.....	405	3991	1431	15128	5389	693	231	2679
Orange.....	1192	6460	5039	17956	12506	2261	413	4430
Orleans.....	499	7561	3622	29296	10735	1233	294	4349
Rutland.....	943	7127	5825	23196	12669	1285	474	4104
Washington.....	943	6782	2162	19861	11142	1567	410	5248
Windham.....	632	5010	4156	10186	9777	1349	270	2789
Windsor.....	904	6698	5693	14885	11200	1357	297	4158
TOTAL	8850	77679	52341	244126	131654	14521	3969	47812

Totals with corrections

RANDOLPH SCHOOL OF AGRICULTURE.**STATEMENT OF EARNINGS AND EXPENSES.****EARNINGS.**

	July 1, 1918 to June 30, 1919	July 1, 1919 to June 30, 1920
School and Dormitories.		
Tuition,	\$ 118.50	\$ 100.00
Board,	3,286.93	7,571.03
Room,	475.82	1,968.07
Miscellaneous,	323.40	406.91
Total,	\$ 4,204.65	\$10,046.01
Farm.		
Farm Products,	\$ 1,909.29	\$ 1,805.68
Live Stock,	65.00	135.00
Dairy,	2,467.24	2,748.76
Poultry,	282.60	442.28
Swine,	778.51	651.93
Horses,	295.48	176.95
Miscellaneous,	268.71	292.62
Total,	\$ 6,066.83	\$ 6,253.22
Grand Total-Earnings,	\$10,271.48	\$16,299.23

EXPENSES.

School.		
Salaries-Wages,	\$ 6,897.00	\$10,010.39
Supplies,	1,328.21	2,210.93
Repairs,	77.72	20.99
Miscellaneous,	911.73	1,797.01
Total,	\$ 9,214.66	\$14,039.32
Dormitories.		
Wages,	\$ 1,866.84	\$ 2,646.93
Supplies,	2,452.49	6,477.02
Repairs,	42.26	107.01
Miscellaneous,	80.40	1,848.71
Total,	\$ 4,441.99	\$11,079.67

Farm.

Wages,	\$ 3,233.21	\$ 3,884.51
Supplies,	3,866.21	3,725.99
Repairs,	117.53	456.00
Miscellaneous,	310.17	627.96
Total,	\$ 7,527.12	\$ 8,694.46
Improvements,	\$10,285.20	\$ 21.09
Grand Total-Expenses,	31,468.97	33,834.54
Deficit,	21,197.49	17,535.31

THE T. N. VAIL AGRICULTURAL SCHOOL AND FARMS.**STATEMENT OF EARNINGS AND EXPENSES.****EARNINGS.**

	July 1, 1918 to June 30, 1919	July 1, 1919 to June 30, 1920
School and Dormitories.		
Tuition,	\$ 181.00	\$ 186.89
Board,	3,004.12	8,258.28
Room,	451.51	1,624.23
Miscellaneous,	1,417.62	130.03
Total,	\$ 5,054.25	\$10,199.43
Farm.		
Farm Products,	\$ 2,937.30	\$ 2,984.51
Live Stock,	5,694.16	5,301.50
Dairy,	17,498.94	15,295.93
Poultry,	429.50	362.70
Swine,	2,697.49	2,110.89
Horses,	472.00	100.00
Miscellaneous,	1,154.55	404.68
Total,	\$30,883.94	\$26,560.21
Lighting Plant,	641.05	976.59
Grand Total-Earnings,	\$36,579.24	\$37,736.23

EXPENSES.**School.**

Salaries-Wages,	\$10,581.99	\$10,874.50
Supplies,	4,785.70	1,899.99
Repairs,	58.74	336.00
Miscellaneous,	1,535.24	841.59

Total,	\$16,961.67	\$13,952.08
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Dormitories.

Wages,	\$ 1,918.02	\$ 1,746.53
Supplies,	3,067.03	8,058.44
Repairs,	40.93	208.23
Miscellaneous,	169.13	222.48

Total,	\$ 5,195.11	\$10,235.68
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Farm.

Wages,	\$16,858.25	\$20,831.98
Supplies,	16,604.22	19,856.46
Repairs,	1,227.58	920.16
Miscellaneous,	1,629.65	661.41

Total,	\$36,319.70	\$42,270.01
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Lighting Plant,	\$ 1,228.13	\$ 1,810.41
Improvements,	3,399.40	
Grand Total-Expenses,	63,104.01	68,268.18
Deficit,	26,524.77	30,531.95

REPORT
OF THE PROCEEDINGS OF THE
FORTY-NINTH ANNUAL CONVENTION
OF THE
Vermont
Dairymen's Association
HELD AT
THE ARMORY, BURLINGTON, VT.
January 14, 15, 16, 1919



ST. ALBANS MESSENGER CO.
1919

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OFFICERS OF THE VERMONT DAIRYMEN'S ASSOCIATION.**PRESIDENT.**

F. H. BICKFORD.....Bradford

VICE-PRESIDENTS.

S. L. HARRIS.....Proctor

C. C. GATES.....North Hartland

SECRETARY.

O. L. MARTIN.....Plainfield

TREASURER.

M. A. ADAMS Derby

AUDITOR.

F. L. DAVIS.....Hartford

**PROCEEDINGS OF THE 49th ANNUAL MEETING OF THE
VERMONT DAIRYMEN'S ASSOCIATION.**

THE ARMORY, BURLINGTON, VT., JANUARY 14, 15, 16, 1919.

The 49th Annual Meeting of the Vermont Dairymen's Association convened at 10 o'clock, January 14th.

Music was furnished by Miss Fennell, Pianist and Miss Canning, Violinist.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

Father of all the Spirits, Guide and Guardian of all nations, lover of all creatures that Thou hast made, we look unto Thee for Thy blessing on our hearts; that Thy Spirit may move us into a larger and closer association of mankind, into the prosecution of all high endeavor, into the love of all pure and noble things. We come to Thee with gratefulness because Thy mercy has lifted from us the shadow of the great war; we come to Thee with gratitude that Thou hast prolonged our lives and given to us richly to enjoy the fruits of the earth that nourish us. We come to Thee, Oh Mighty Spirit, with hopeful hearts that hereafter men shall live together in peace and harmony, that hereafter we may prosecute the same clean purpose in an earth that shall bring unto mankind a better Brotherhood, an association with and a closer and a livelier bringing together of all children of the sons of men; and with hopeful hearts we ask Thy blessing upon all the purposes of our meeting here that we may learn the great laws of Thy creation; that we may co-operate with Thee in the high and great purpose of bringing about a wider and a wiser life upon the earth that Thou hast given to us to guard and keep. Bless Thou us in our toil and endeavors, lighten the darkness for us, give us the inspiration of a faith that looks onward and upward now and always,—in the name of Christ-like souls we would come into communion with Thee. Amen.

In recognition of the faithful and efficient service for the Vermont Dairymen's Association for the last six years, the Reverend Charles J. Staples, Pastor of the Unitarian Church, was presented with an honorary life membership in the Association. The presentation was made by President Bickford.

In the absence of Mayor Jackson of Burlington hearty words of welcome were extended to the Association by President James P. Taylor of the Greater Vermont Association. Mr. Taylor said he was glad to welcome the dairymen because they represented organized endeavor. He particularly urged the necessity of advertising the product of the dairy and to make such publicity distinctively Vermont.

Treasurer Adams responded on behalf of the Association in lieu of first Vice-President Harris, who was not present. Mr. Adams confessed to being an old member of the Association and expressed the thought that if the sturdy men who 49 years ago organized the Association could look in upon this meeting they would have every reason to be proud of the growth and development of it. At the beginning Mr. Adams said there were but one or two speakers at the annual convention and very few samples of butter were exhibited; he also spoke of the improvement in the process of butter making during the past 40 years.

In concluding Mr. Adams expressed the pleasure it always gave members of the Association to meet in Burlington and said that it was an ideal city for the annual gathering.

TUESDAY AFTERNOON SESSION.**DAIRY PRODUCTS IN THE NATIONAL DIET.**

**DR. H. B. ELLENBERGER, PROFESSOR OF ANIMAL AND DAIRY
HUSBANDRY, UNIVERSITY OF VERMONT AND STATE
AGRICULTURAL COLLEGE.**

The Federal Food Administration tells us that the National Food Bill (total food consumed at wholesale prices) for the year ending June 30th last was \$10,536,394,288. This includes breadstuffs, vegetables, sugar, fruits, oils and nuts, fish, meats, poultry and eggs and dairy products. For dairy products alone there was expended \$2,521,521,835 or 24% of the nation's total food bill. Chart 1 shows the relative expenditures for each of these items. Thus we see that dairy products amount to almost one fourth of the total which gives some idea of the important place they fill in the national diet.

A recent report of the Secretary of Agriculture places the number of our milch cows at 23,300,000. This is only one cow to each $4\frac{1}{2}$ persons. The estimated milk production at 4,000 pounds per cow is 93,200,000,000 pounds. It has been estimated by government experts that the total milk produced is diverted to the following uses;

43.1 %	to home consumption
41.0 %	to butter
5.0 %	to cheese
4.3 %	to calves
3.7 %	to ice cream
2.9 %	to condensed

On this basis Chart 2 shows the quantities diverted to these various uses; this represents approximately

18,683,349,000	quarts of milk
1,819,619,000	pounds of butter
466,000,000	pounds of cheese
229,893,000	gallons of ice cream
1,081,120,000	pounds of condensed milk

CHART 1—The Nation's Food Bill.

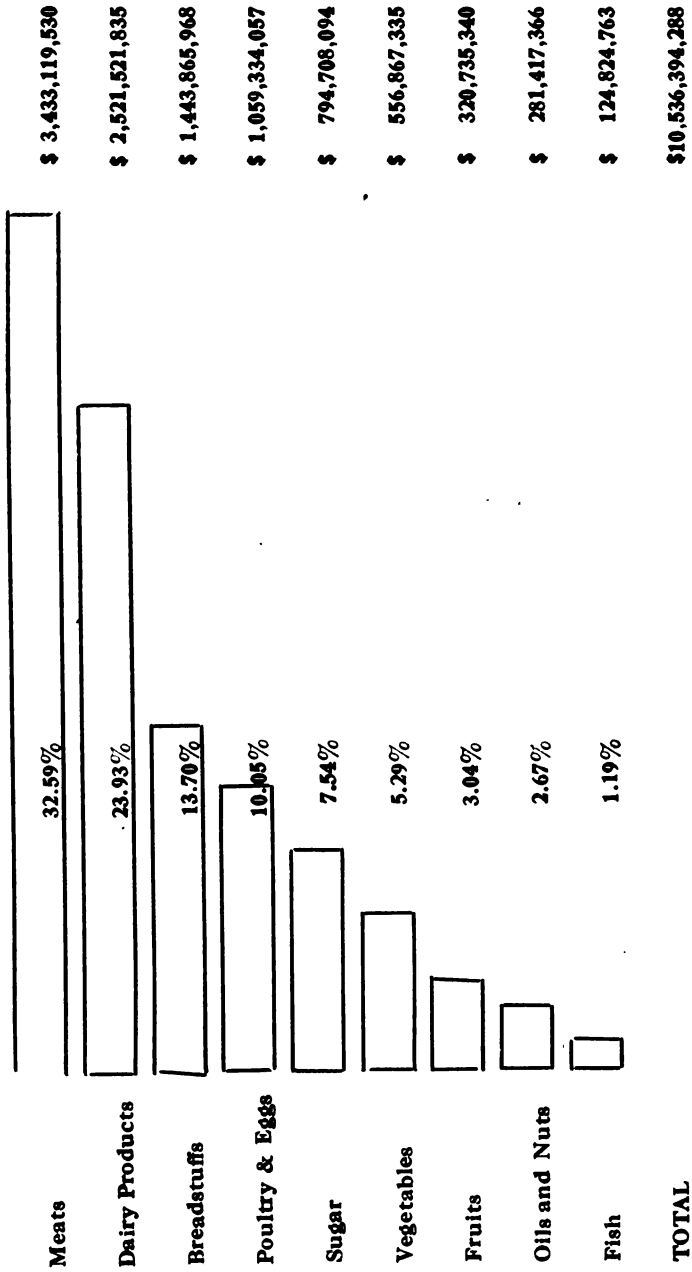
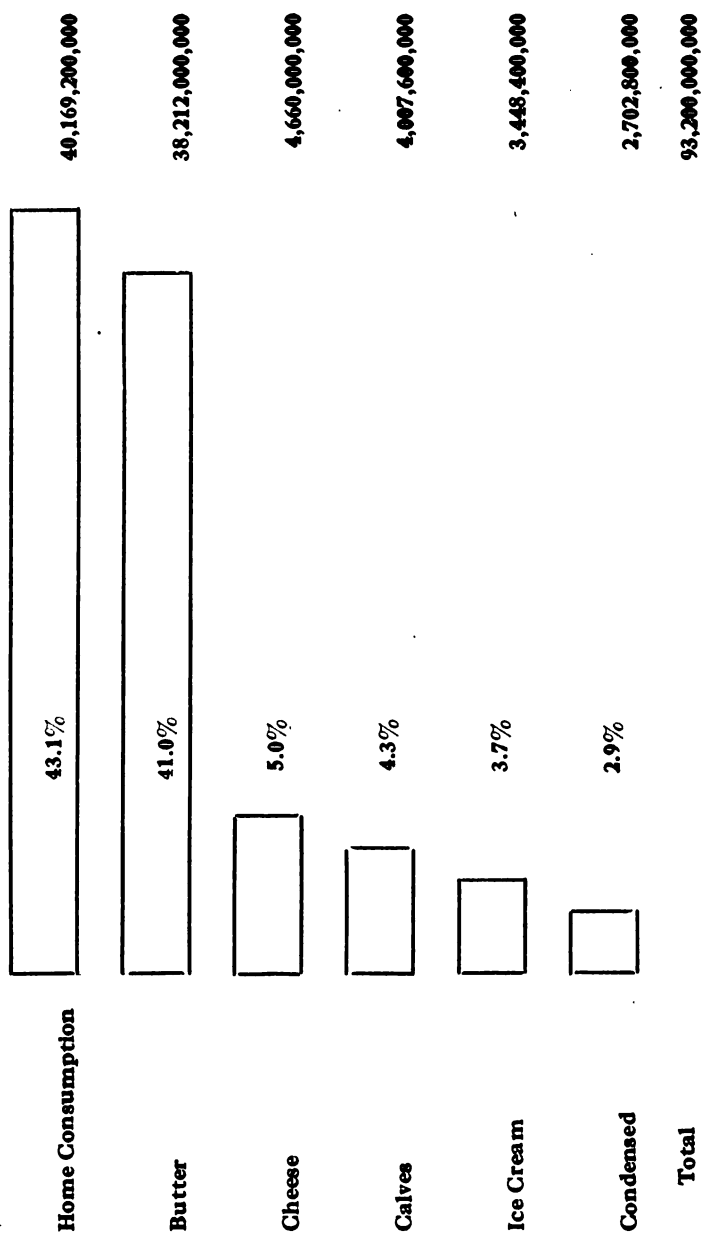


CHART 2.—Where the Milk Goes.



Besides these a vast amount of veal, beef and pork are direct products of the dairy. Of course considerable quantities of dairy products have been exported but after making allowance for these it still leaves a pretty fair meal even for such a nation as ours. We are told that about one fifth of all the food we consume is derived from the dairy. yet vast as this may seem we could still use more to very good advantage.

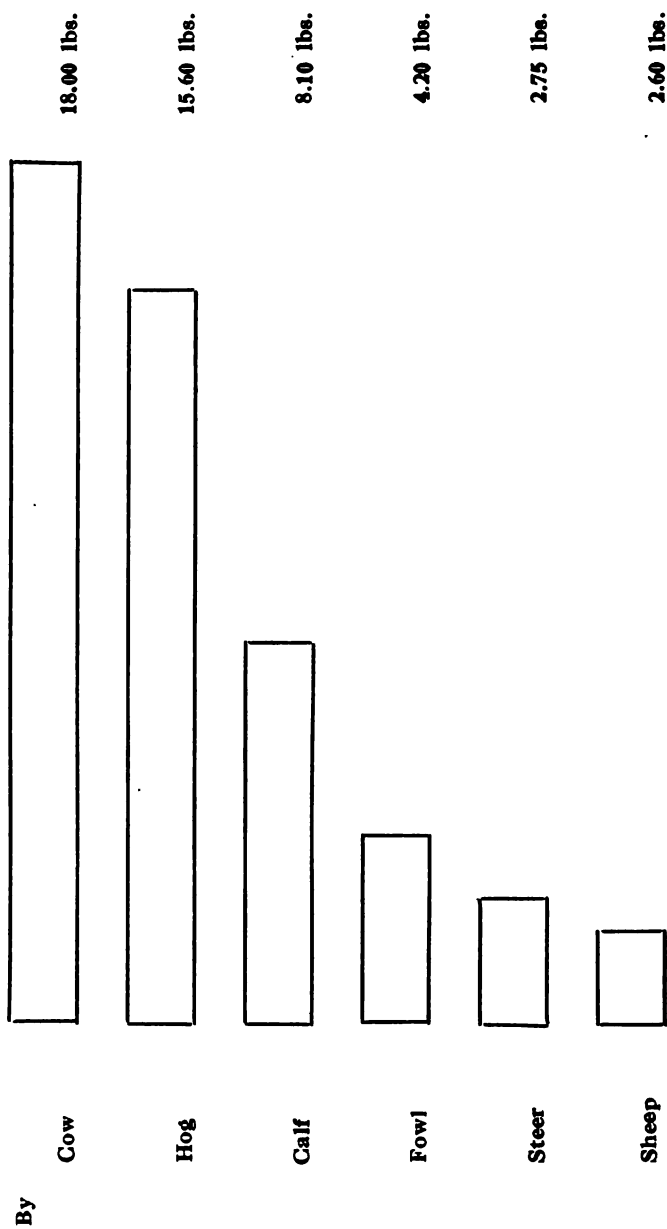
An estimated daily consumption per capita is: 1 pound of milk per day as milk and cream and for cooking, baking, etc., 2-3 ounce of butter per day, 1-6 ounce of cheese per day, 1-2 ounce of ice cream per day.

A man could take this butter, cheese and ice cream all together in one big mouthful so you see we are not over-feeding on dairy products. On the contrary we do not eat enough of them. There are several reasons.

1. ECONOMY OF PRODUCTION.

It is recognized that animal foods such as meat, eggs, milk, etc., are essential to the proper balancing of a national ration. Some kind of animal food is needed for human consumption and of all our domestic animals the dairy cow is the most economical producer of human food. Chart 3 shows the quantities of edible solids produced from 100 lbs. of digestible organic matter in the ration by various animals as given by Jordon.

CHART 3.—Edible Solids Produced From 100 lbs. Digestible Dry Matter.



This shows that the production of a pound of edible beef or mutton solids requires a food expenditure nearly seven times as great as is necessary for the same amount of milk solids. Or comparing the cow and steer in another way, a good cow giving 8,000 pounds of 4 percent milk a year (there are many such) produces 1,040 pounds of edible solids while the bodies of four two year old steers weighing 1,200 pounds each will only furnish 1,002 lbs. of edible solids. Besides the steers must be butchered while the cow is left to repeat next year.

The hog is the only close competitor of the dairy cow. But the cow has a great advantage over the hog when we consider the class of food which she consumes. Hogs eat vast quantities of skimmilk and corn and other cereals which could be used for human food and comparatively little hay, grass and other coarse foods while about 75 percent of the cow's food is derived from products not adaptable to human consumption. In congested regions and under world conditions today the cow must be recognized as an essential and an economical food making animal. Therefore from the standpoint of world production and conservation of food we as a nation would do well to use more dairy products.

2. FOOD VALUES.

There is a great variety of substances which are used by the human race as food but each has a different value for this purpose. Four things are necessary in the diet. These are first, sufficient material for the production of heat and energy, second, an adequate supply of good proteins, third, an ample amount of suitable mineral matter, and fourth, a class of materials for which a suitable name has not been found but which are often called "vitamines." The value of a food to the body is ordinarily measured by its ability to supply one or all of these. Some foods such as certain oils and fats are capable of supplying nothing but heat or energy while others such as milk may supply all four of these factors. We may then compare the food values of different food substances according to the available quantities of these necessary ingredients which they are capable of supplying.

ENERGY VALUE.

On this basis as a source of energy dairy products are compared to other foods in the following table:—

ENERGY VALUE OF FOODS. Table 1.

Food	Calories per pound	1 qt. milk equals	Price per pound	Cost in Cents
Butter	3410	3.0 oz.	\$.75	14.1
Cheese	1895	5.6 "	.40	14.0
Rolled Oats	1800	5.8 "	.08	2.9
White Beans	1520	7.0 "	.15	6.6
Pork Chops	1245	8.5 "	.37	19.5
Wheat Bread	1200	9.0 "	.10	5.6
Round Steak	890	12.0 "	.50	37.4
Leg of Mutton	890	12.0 "	.35	26.4
Fowl	765	13.9 "	.42	36.4
Veal Cutlets	695	15.4 "	.60	57.7
Eggs	635	9 eggs	.88 dz.	66.0
Cottage Cheese	500	13 lbs.	.20	26.0
Mackerel	370	1.8 "	.35	63.0
Milk	310	1 qt.	.15 qt.	15.0
Chicken	305	2.2 lbs.	.47	103.4
Potatoes	295	2.3 "	2.00 bu.	7.7
Oysters	225	3.0 "	.40	120.0
Codfish	220	3.0 "	.25	75.0
Apples	190	3.5 "	.05	17.5
Skim milk	155	4.3 "	.07	13.7

By this we see that cheese furnishes more than twice the energy of round steak, or leg of mutton, butter supplies twice that of oatmeal or beans and milk 50 per cent more than oysters or codfish.

The quantities of several foods required to equal one quart of milk in energy are also shown. The relatively high energy value of whole milk is thus clearly seen and butter and cheese easily lead the list.

PROTEIN VALUE.

As a source of protein dairy products stand exceedingly high. Proteins are not all alike. Some are much more valuable as food than others. Those of milk are particularly efficient. Chart 4 from a Wisconsin bulletin illustrates these variations in the nutritive value of proteins and

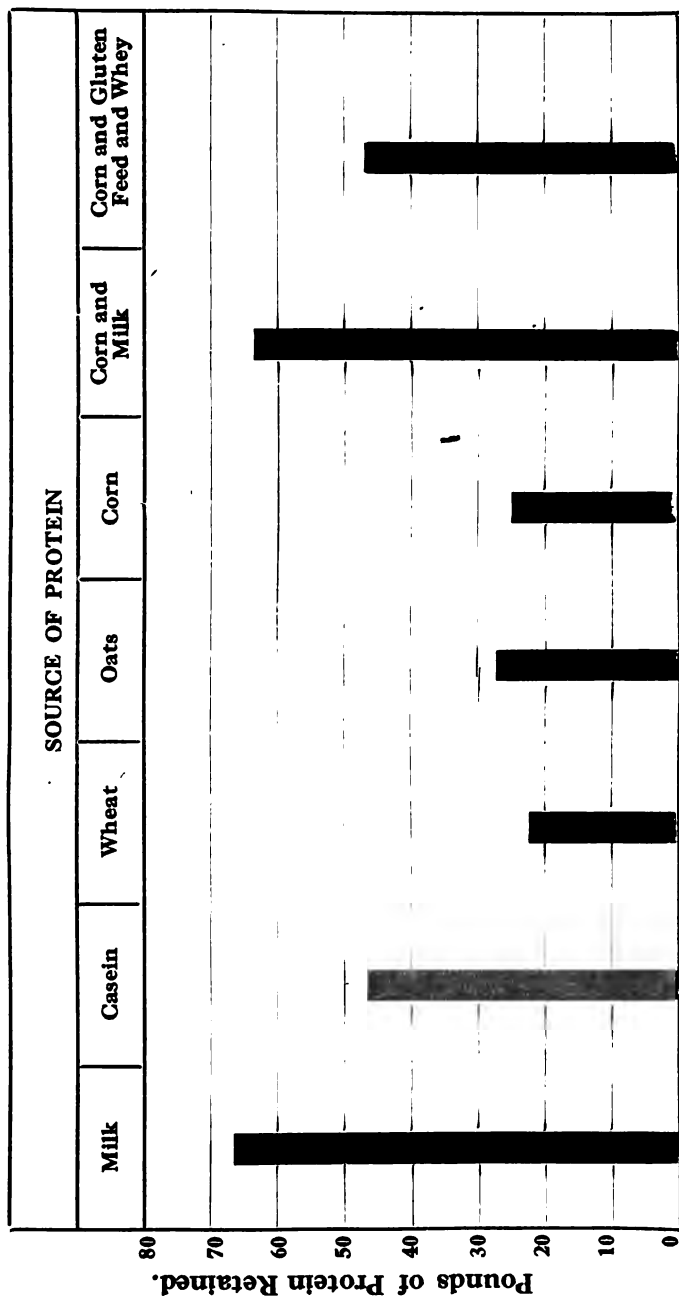


CHART 4—Difference in the Nutritive Efficiency of Proteins, showing the number of pounds of Protein which a pig can retain for growth from each 100 pounds of Protein consumed when the Proteins are derived from the different sources indicated.

the remarkable supplementing power of milk in improving the efficiency of cereal grain proteins. This is the result of feeding trials with pigs. But disregarding this difference in value of the various kinds of protein and taking into account only the quantities available it may be seen from Table 2 that dairy products are very important protein foods.

PROTEIN VALUE OF FOODS. Table 2.

Food	Percent Protein	1 qt. milk equals	Price per pound	Cost in Cents
Cheese	28.8	4.0 Oz.	.40	10.0
Cottage Cheese	20.9	5.3 "	.20	6.6
Round Steak	18.4	5.9 "	.50	18.4
White Beans	17.5	6.2 "	.15	5.8
Leg of Veal	15.0	7.3 "	.50	22.7
Leg of Mutton	14.6	7.5 "	.35	16.5
Rolled Oats	14.2	7.8 "	.08	3.9
Fowl	13.3	8.3 "	.42	21.8
Pork Chops	13.0	8.5 "	.37	19.6
Chicken	12.8	8.6 "	.47	25.1
Eggs	12.7	4½ eggs.	.88 doz.	31.5
Codfish	10.8	10.2 oz.	.25	15.9
Mackerel	9.9	11.2 "	.35	24.6
Wheat Bread	7.8	14.0 "	.10	8.7
Oysters	5.8	1.2 lbs.	.40	48.0
Skim milk	3.3	2.1 "	.07 qt.	6.7
Milk	3.2	1 qt.	.15 "	15.0
Potatoes	1.5	4.6 lbs.	2.00 bu.	15.3
Apples	.3	23.0 "	.05	115.0

The quantities of these various foods required to equal 1 quart of milk as a source of protein is also given in this same table. It should be noted that cheese contains twice as much protein as the average of the various meats, eggs and beans while milk considering that it is a liquid food ranks high. When reduced to a dry matter basis milk compares in percent of protein as follows:—

Whole milk,	25%
Skim milk,	36%
Cheese,	39%
Round Steak,	57%
Smoked Ham,	26%
Wheat Bread,	15%
Potatoes,	10%
Apples,	3%

MINERAL MATTER.

The third necessary ingredient of food, mineral matter is very important tho it has not been given the attention which energy and protein have received. On a dry matter basis that is in the solid material in the following foods

Whole milk	contains 5% mineral matter.
Skim milk	contains 6% mineral matter.
Buttermilk	contains 8% mineral matter.
Cheese	contains 6% mineral matter.
Round Steak	contains 3% mineral matter.
Smoked Ham	contains 8% mineral matter.
Wheat Bread	contains 1% mineral matter.
Potatoes	contains 4% mineral matter.
Apples	contains 2% mineral matter.

Thus we see that dairy products again rank high as suppliers of mineral matter. But again mineral matter is not all the same. That in milk and its products is generally admitted to be a most efficient mixture particularly for the young growing child. It is interesting to note that those animals whose young grow very rapidly secrete milk relatively richer in total mineral matter and in calcium and phosphorus. Thus the importance of mineral matter as a growth factor is emphasized. This is shown below.

Species.	Days Required to Double Wt.	% Compounds Found in Mothers' Milk		
		Ash.	Ca.	P.
Human,	180	.2	.021	.022
Cow,	47	.7	.114	.087
Pig,	14	.8	.178	.135
Dog,	9	1.33	.321	.223
Rabbit,	6	2.5	.636	.437

The minerals of milk contain according to Richmond:

Lime,	20.27
Magnesia,	2.80
Potash,	28.71
Soda,	6.67
Phosphoric acid,	29.33
Chlorine,	14.00
Iron,	.40

If used as the only article of food milk is claimed to be somewhat deficient in iron but no one advocates that an

adult should live on milk alone. All the other mineral constituents such as lime, phosphorus, magnesium and potassium are plentifully supplied in milk. Milk is the cheapest and most valuable source of lime we have.

"VITAMINES."

Little is known about these factors except that when foods containing them are absent from the diet young animals cease all growth. A number of investigators have demonstrated this. Dr. Hopkins of Cambridge, England first showed that animals might be fed on a chemically perfect ration containing the required amounts of fats, sugars, starches, proteins, and mineral elements and yet make no growth and further that if a small quantity of milk was added they would at once start to grow but if the milk was withdrawn growth would cease again. McCullum and Osborne and Mendel in this country have demonstrated that there are two kinds of substances sometimes called "vitamines" involved and that both are essential in the diet. One of these occurs dissolved in the fat of certain foods tho some seeds and plant leaves also contain small amounts. Alfalfa and cabbage leaves contain quite liberal quantities but certain fats furnish our principal supply. It does not occur in all fats. Meat contains some of it but milk fat as it occurs in milk, butter and cheese and egg fat contain it in abundance while it is absent or very deficient in vegetable fats and most animal fats—such as cottonseed oil, neutral lard, etc. Thus margarine is not a substitute for butter in this respect. Oleo or margarine may be substituted for butter but it is not a substitute for butter. There is an important difference between a substitution and a substitute in this instance. The distinction is this: If I have a one dollar bill in my hand and someone takes it and gives me a silver dollar in its stead he has given me a substitute for the bill, for the silver dollar will do just as much for me as the dollar bill. In other words it is of the same value. But if the one dollar bill is taken from me and a 50 cent piece given me in its place the 50 cent piece is substituted for the dollar bill but it is not a substitute for it because 50 cents will not take the place of a dollar bill. It will not purchase as much and does not have the same value. Just so with butter and margarine. Margarine may be substituted for butter but it is never a substitute for it because margarine cannot supply all that butter supplies; it does not have the same value.

The other factor referred to is soluble in water. It is not found in fats. It too is absent from certain foods and when absent from the diet no growth occurs. Milk and eggs also furnish sufficient amounts of this factor. The germ of grains contains considerable quantities but in wheat flour or degerminated cereals it is absent. The dairy cow concentrates both of these factors and places them in her milk.

Then a second reason why we as a nation should use more dairy products is that as a combined source of energy, of protein, of minerals, and of "vitamines" they have no equal among all our foods.

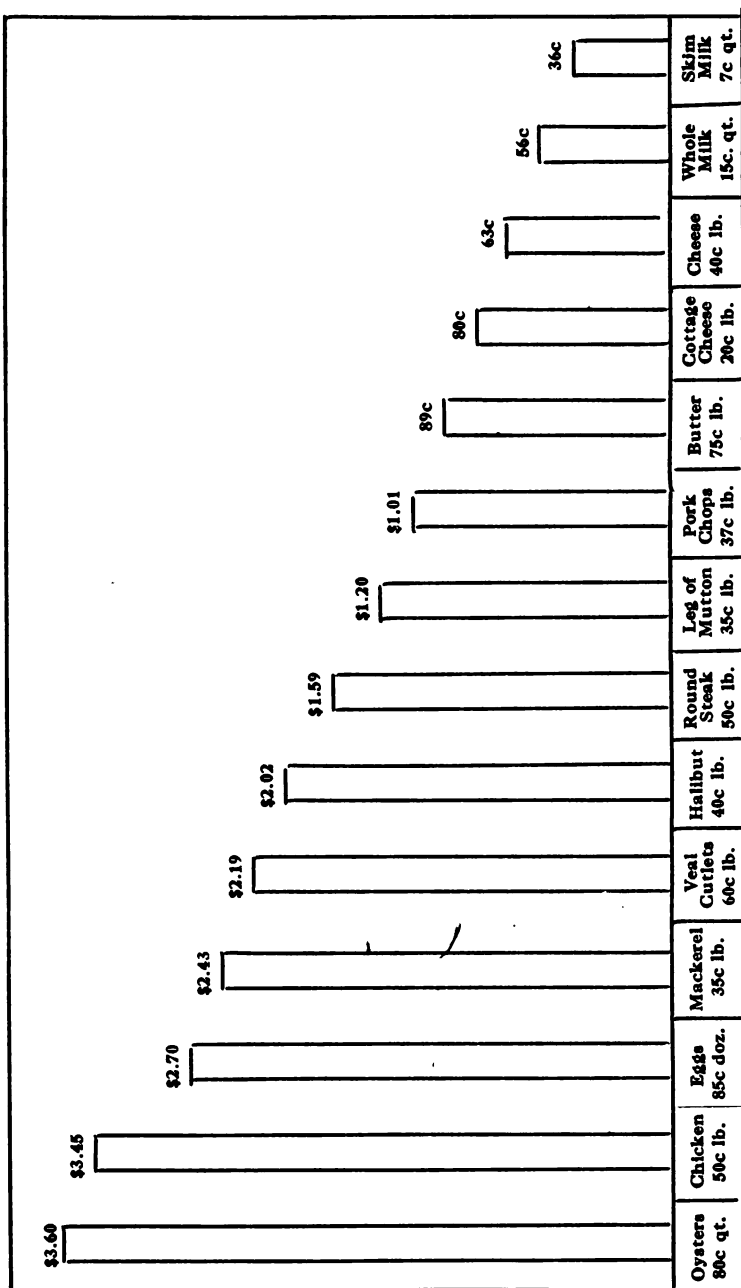
But we must consider the cost of the foods we use.

3. FOOD COSTS.

It has been shown that dairy products have a relatively high food value but we are told that they are high in price. Well everything seems to be high in price at present. The only fair way to determine whether a food is high in cost is to compare it with other foods of a similar nature or equal value. It is difficult to combine the four factors which have been considered in comparing food values because different foods do not contain all of them in comparable proportions. Milk or cheese cannot properly be compared with vegetables or cereals. When we compare dairy products with comparable animal foods such as meat, fish, poultry and eggs we see by referring to tables 1 and 2 that they are cheap rather than costly sources of energy and protein. As much energy value can be purchased in butter, cheese or milk for 15 cents as in pork chops for 19, steak for 37, mutton for 26, eggs for 66, mackerel for 63 or chicken for 103 cents. As much protein can be purchased in milk for 15 or cheese for 10 cents as in steak for 18, veal for 22, fowl for 21, eggs for 31, or mackerel for 24 cents. Then dairy products are cheap suppliers of energy and protein, and they are certainly relatively cheap sources of minerals and "vitamines."

Probably the fairest comparison can be made on the basis of edible solids tho the solids in different foods are not exactly equal in value. Chart 5 shows this comparison graphically. It may be noted that 1 pound of food costs 10 times as much in oysters as in skimmilk; 5 times as much in eggs as in whole milk; $2\frac{1}{2}$ times as much in round steak

CHART 5—Cost of 1 Pound of Actual Food in Animal Products.



as in cheese; and 3 times as much in mackerel as in cottage cheese. All dairy products are comparatively low in cost. We are told that one quart of milk costing 15c equals

3-4 lb. of beef steak costing	37c
3-5 lb. of ham costing,	36c
1 pt. of oysters costing,	40c
8 eggs costing,	57c
2 lbs. chicken costing,	90c
4-5 lb. pork chops costing,	32c
3 lbs. fresh codfish costing,	75c

Then our third reason why the consumption of dairy products should be increased is that from the standpoint of cost they are our cheapest animal foods.

PRICE INCREASES.

We are told that dairy products have made an undue increase in price, that we could buy milk at 9 cents per quart before the war while we must pay 15 now and therefore people cannot afford to use it. Again the only fair way to decide whether this is just criticism is to compare price increases of dairy products with those of other foods. In Table 3 is shown the percentage increase in cost here in Burlington of several foods starting with 1913, before the war, as a basis. The average increase in price of this list of foods is 78 percent while dairy products have only increased 74 percent over the same period and meat, fish, and other products show an increase of 79 to 81 percent.

PERCENTAGE INCREASE IN FOOD PRICES. Table 3.

	1913	1918	Average
Milk	100	167	174 Dairy Products
Cheese	100	167	
Butter	100	187	
Round Steak	100	200	
Veal Cutlets	100	171	179 Meats and Poultry
Pork Chops	100	179	
Chicken	100	167	
Fowl	100	172	
Cod Fish	100	167	179 Fish and Eggs
Halibut	100	160	
Eggs	100	188	
Oysters	100	200	
Flour	100	188	Flour, Sugar and Potatoes
Potatoes	100	200	
Sugar	100	156	
All	100	178	
Dept. of Labor Index (Wh)		179	179
Dept of Labor Index, Clothing		236	236

Thus we see the cry about excessive increases in price of dairy products is unjust since almost everything else shows a greater increase.

While the prices and the increases quoted are taken from local reports they seem to reflect quite accurately the conditions thruout the whole country for the Department of Labor Index is quoted as showing an average increase in price of 79 percent over these same five years. This is only a 1 percent variation from the increases as shown in Table 3.

To sum up we have seen that the dairy cow is the most economical animal machine we have for the production of human food; that dairy products have no equal as a combined source of energy, protein, mineral matter, and "vitamines;" that the cost of a unit of food material is lower in dairy products than in any other comparable class of foods; and finally that price increases over the past five years show that dairy products have not increased as much as other commodities.

Then considering real food value, cost, and economy of the worlds' food supply we as a nation should use more dairy products in the diet and our people should be educated to this fact. Milk is almost a perfect food and people should not make the mistake of buying less because it has increased in price; it is still one of our cheapest foods.

The future of the dairy industry depends upon our national consumption. Conditions now provide a market for all our dairy products but later these will not be needed in Europe, and I believe that the dairyman should prepare for this time by carrying on a sensible, sound, educational campaign and thereby create a greater demand here at home. If the dairymen of the country will do this they will not only benefit themselves but will render a service to the nation as a whole for there is no danger that we will ever use more milk and butter and cheese than is good for us.

MORE SHEEP—MORE WOOL.

A. C. BIGELOW, PHILADELPHIA.

I have traveled quite a distance to speak to you on the question of sheep and am here at the invitation of Mr. Martin, your secretary. I really felt I had an obligation to come to Vermont because some of my ancestors came from Plymouth Rock to your state and settled at Woodstock.

I am not going to talk to you of sheep per se simply from the narrow view point of sheep alone but I want to endeavor to present to you some view of sheep in connection with our economic problems and our agricultural situation in general. For 3 years my work in this campaign has been operating an association which is supported by voluntary contributions and I have put a vast amount of work into it and sacrificed myself considerably simply for the reason that I felt it was a proposition of the utmost importance. Many of you may be isolated by being removed from the centers of business activity, at the same time you must appreciate that as the result of this war we are in the midst of tremendous confusion; we face extraordinary conditions and as a matter of fact, as I see it from my contact with the world and what I read, the world itself at large, this nation, every individual in this nation is faced by a great big interrogation point. We have before us most momentous problems that are going to have the most decisive influence on the future of this nation and the world. When we consider the problem of answering these questions that come up to us today we must go back a bit and review the past to a slight extent.

I do not wish to take up too much of your time but I do wish to call your attention to the fact,—if any of you here are as old as I am,—that you have seen in the course of say an even half century in this country, a period that you may term—and I think properly and distinctively—a period of exploitation of our national resources.

Our ancestors came here and found a country rich in natural resources, containing greater wealth than any other similar area that has ever existed. We had so much, we were so rich in everything that we made no intelligent con-

servation or intelligent use of what was given us by God Almighty, but went to work in the easiest way to get our living from the soil without regard to the future. That applies especially to the question of agriculture which after final analysis depends upon the question of the fertility of your soil or what it will produce. One of our greatest Americans, J. J. Hill, said in St. Paul in 1906 that we had depleted our soil more in 50 years than we should have in 500 years of proper use.

There is one answer to the question that stares us in the face and there is an answer or rather sequel to this proposition which we face today that must be recognized as a matter to which we must devote ourselves,—the necessary constructive measures for the development or welfare of the country. We cannot longer be wasteful or extravagant. We must build up from the ground if we are going to see the prosperity that we want to see.

In regard to the necessity for constructive work,—there is a situation today which stares us in the face as a result of this war and that is the vast accumulation of debts which we have incurred and which the world is incurring. We speak today commonly and currently in terms of *Billions* as we would a few years ago in terms of *Millions* and yet it would be most difficult for any one here I think to put your mind on it and try to realize what a billion dollars means. Our National debt, if I remember correctly, is said to be about 35 billion dollars, and the world debt is said to be 275 billions. That is a load, gentlemen, a load that has got to be carried, has got to be paid. How are you going to do it? It is going to come out of your pocket and out of mine. The government of this country, our agent, is going to pay these debts by taxes. And if you will look over the matter carefully you will find out what the taxation idea is and how the taxes are going to be raised and you will come to the conclusion that no one will escape paying his share one way or another, directly or indirectly.

You have undoubtedly seen in the papers and on the posters the one great necessity that is impressed upon the people of the United States to day—thrift,—economy. Cut down your expenses for a definite purpose, so you may have money saved up to pay these taxes. You have got to pay them. If you do nothing but save money, if you cut down living expenses and economize to pay these taxes the system is going to reduce your income; it is going to reduce the national income. There is one other way in which you may help in the payment of these national debts,—not only exer-

cise thrift and all reasonable economy but there must be an *increased production*. *Not only save but produce more*. In that way you will be able to provide for your own necessity and even for your neighbors. By increased production you will be able to help pile up surplus capital for use of the nation, which it is necessary to provide for the rehabilitation and restoration of this country.

There is another aspect of this question of sheep,—a more important aspect; and that is the question of food production in the United States. It is very interesting to see the food bill of the people of the United States brought down to a percentage basis. It has been established that the average individual consumes from his income, pays for his food, between 40 and 50 percent; for food and clothing *more* than 50 percent of his total income. From that you will understand how important a part food plays in the family income and in the family expenditure.

I don't know whether you have come in contact with the figures but beginning with the year 1900 our population has increased to a tremendous extent and as our population has increased our agricultural production has not increased to equal population. There has been a decrease per capita in food production and that decrease has been followed steadily and logically by the fact that the cost of living has been advancing. It was only a few years ago, before the acute condition existed, that you would read in the papers and see cartoons about the high cost of living and complaint about the prices of meats. It logically follows that you can't have an increase in population without increased prices of food. There has been a very marked change in the ratio of our rural to our urban population and this change has direct bearing on the consumption of food and lessened production of food. In 1880 the ratio of rural and urban population was 71 to 29; it now stands 50-50 and still progressing along the same line. It is so all over the world. It is this situation that is facing us today.

There is one great big basic factor which is going to be a controlling influence in our competition against the other nations and that is the rate of wages. It is recognized that the rate of wages is to a very large extent, based or controlled by the cost of living.

There is another situation also and that is in the congested areas of our great cities, our great industrial centers —(there are thousands of them from the Atlantic to the Pacific) we have a mass of un-Americanized workmen. Many of these workers, as I know from my own knowledge

from investigation, receive a rate of wages just about sufficient to allow them to live. On account of that condition you have noticed during the past few years since the cost of living has risen there has been more and more of industrial unrest. You can't have a man contented, you can't have a man develop an energy of good workmanship, you can't have him feel satisfied with himself or the rest of the world if he is working on an empty stomach and his children are going to school without breakfast, as thousands today are doing.

You have not failed to notice the disorganized condition of the population of Russia and threatened trouble in Germany, they call it Bolshevism. If you have read the papers recently and have studied the conditions in our own country you will realize that we are not so far removed from any such condition that we may feel absolutely sure of our safety. As a matter of fact there is an element of Bolshevism today that is actively engaged in the industrial centers of this country. You will remember the leaders of the Russian Bolshevism came from New York City.

The sheep industry has been neglected; nobody has taken it up, it had rather a black eye a good many years ago when we had a superabundance of wool and it went down to around 14 or 15c per pound. Then it was farmers got disgusted and went out of the business. Since then nobody has taken it up and it has been neglected. But during the last 3 years it has been my work to interest the people of the United States and the farmers in sheep and to prevail upon them to recognize the fact that sheep are really an essential part of our agricultural production. I don't think that I need to state to this audience here that it is recognized that live stock is the basis of sound agriculture. You can't keep a farm in proper shape if you don't keep live-stock on it to return something to the soil which you take from it. What I wish to impress upon you is the fact that sheep are just as valuable and in some cases more valuable as a part of agricultural production than any other animal.

One trouble with the sheep husbandry is, it has not had intelligent direction. It has not been handled on any sort of scientific or a proper basis. You men here doubtless have run up against some hard problems in your dairy business. You did not know what was the matter with you for a good many years. You discovered a few things because you had the facilities; you had men sent to help you find out what the difficulty was and you ascertained that you were not following scientific methods of production. Sheep men

in the old days had no help. As your cow-testing associations were organized you soon found out the trouble and where your short-comings were. When you began following scientific methods of production the complexion of things changed. You found out you had a lot of star boarders in your dairy eating their heads off. You found you had a lot of others just about splitting even, with only a small proportion of your stock making money for you.

Now it is a good deal the same way with the sheep industry. It is just as essential if you are going to keep sheep to use the proper kind of breed as with cattle. It is also just as important to use a balanced ration and the greatest economy in food in raising sheep as it is in your dairy business and the result will be the same. If your treatment of the sheep is right you will make money. I'm not going to attempt to give you any technical details in regard to management of sheep. I will leave that to your own people here. I don't know the extent of your land in Vermont peculiarly adapted for sheep raising but I assume that the rain falls, water runs, and grass grows here the same as they did years ago when you had a million and three-quarters of sheep in the state. I know there are places in this state that you can raise sheep to advantage, where a flock of sheep upon your farms would pay you good money, and if that is the case I want those who have some such opportunity to consider this question because the farmer has got to be a good business man just the same as the rest of us in our particular lines of business. Our manufacturers, with their great big plants, lie awake nights studying the question of the cost of production, the question of their overhead charges. You have your overhead charges as well. You have the plant in your farm, and the money you have invested in your machines, you have your overhead charges in your labor. What you must do is to get the biggest production off your land that you possibly can. The question is, are you doing it?

I presume there are a great many owners of dairies in this state who could allow a few sheep to run with their cows to advantage. I know from my experience that there are many farms with ample lands that do not produce a thing where sheep could be kept to advantage. I have been up in Maine and have seen a whole township with first class buildings,—(houses that I would like to live in myself) sold for \$10.00 an acre,—I have been in the south and seen millions of acres down there that have been idle up until the present time, producing nothing. In the great north-west and Michigan and Wisconsin acres of land are lying

idle, producing nothing. I have a place now of 5,000 acres in that locality where they are producing something for the benefit of the nation.

The people of these United States have been the most improvident, wasteful people on the face of the earth and have allowed opportunities to pass without developing them. You can't sit here and be satisfied with yourself as you have been satisfied a good many years and allow the world to drift on under these conditions; you have got to produce; you have got to utilize these resources.

As to the question of dogs. This is a most peculiar situation. Here we have a great big nation of people needing food, people going without wool clothing because they can't afford to pay the price for it and yet we are obsessed with a certain sentiment for an animal called a dog so that we allow it a license to kill and destroy, which we would not allow even to our own children. If my child goes over on to my neighbor's property and kills my neighbor's chickens or destroys his flower beds or pulls up his vegetables the law, as you know, holds me responsible and I may be held under bonds to see that my child don't do the act again. But the dog—less than half an hour since I saw 4 worthless curs on your park—these dogs are just as liable after dark to slink off and destroy sheep or kill poultry or break up birds' nests and even kill hogs and small cattle. But you permit it! There is another singular thing that people—and some are Sunday school attendants—will repeat the Golden Rule, "Do unto others as ye would others would do unto you" and feel satisfied they are doing that, but they keep a dog and they allow that dog to run anywhere thru-out the country and injure and destroy the property of others. If the owner of the dog could understand the golden rule and what his moral obligation is to other people he would keep his dog at home. Let him make barns, the most comfortable quarters in the world, for his dogs and keep them on his own premises where they will do him some good. That will simplify the great question and you will not have to enact dog laws. The trouble is the people do not recognize the situation at all and the consequence is we must have dog laws. I only trust there will be some recognition of this fact in your state. If you are going to have an industry that will add profit to your farms, and which will increase the prosperity of your state and give you added wealth, *you must control the dog!* These things are being recognized generally thru-out the United States today and dog laws are being enacted. As I said before you have got to be a good business man if you are going

to make money in the industry of sheep or anything else, you have got to do the business in the right way; you can't do it by producing an inferior article.

DEMONSTRATION.

The one anchor, the chief anchor the sheep industry has to tie to is the food situation,—the demand for meat production. Your whole profit or loss rests on the question of whether you produce, as you can do, 100% lambs. There is no doubt at all that the demand for food, the demand for meat, to meet the present war emergency and feed the starving millions abroad and to meet the feeding proposition made necessary by the increasing population of this country has got to be such that meat products are going to be on relatively high basis; and if wool declines, as it will, as every other commodity will—there is nothing that will stand on the present inflated basis, every commodity in the United States is going down,—you should not be discouraged, because the price of all articles will be in relation to each other and the one chief anchor that you can tie to and depend upon as the most profitable part of the industry is the marketing of your lambs and the kind of lambs you produce.

ORGANIZATION AND CO-OPERATION.

C. A. BADGER, EAST MONTPELIER.

Mr. Chairman, Ladies and Gentlemen:—

For the last 16 years I have met with you and every year until this I have brought a sample of butter or sugar or both. This year I had nothing to bring and to punish me, I expect, they have asked me to "stand on the floor." Next year I assure you I will bring some exhibit, and in that manner save you the hardship of listening to me.

Organization and Co-operation is a large subject for anyone to handle and particularly me. The subject has about as many sides as a box and a box, you know, has 4 sides around it, the top and the bottom, the inside and the out, making 8. I am not going to try to explain all those different sides, but will cut the number down somewhat.

Nearly all trades are organized, organized to the limit and some of them carry the thing too far and that makes a monopoly or trust. Organization cannot go a great ways without Co-operation. I would not advise anyone to organize unless there is something to organize for and something for that organization to do. In order to carry organization out you must have co-operation and you can not very well have co-operation unless you have an organization to tie to. Nearly every trade is organized except the farmers. Why don't the farmers organize? You have heard it said frequently that it is for lack of leaders. I don't agree. I think the farmers have just as good men for leaders as any other class; sometimes I think they are better. A prosperous farmer has got to be an all-round man; he has got to have a good level business head; he has got to understand things and have a broad liberal mind. We have many of those men in our farm organizations. I think the chief reason why farmers do not organize is because of a situation such as we have in Washington County where we have a farm bureau. It works out about like this; we have about 1,500 good farms in Washington County. We have farm owners to the number of 2,500 but a portion of them just barely stay on the farm; they grow poorer every year; their buildings are running down, also the fences. Of the 1,500 good farmers in our county, about 500 belong to the Washington farm county bureau and nearly that number to the Washington Farmers' Exchange. The other thousand—it is hard to tell about them. They seem to be self-satisfied and take too little interest outside themselves. It

is a difficult matter to deal with a self-satisfied man; you get along-side him and try to put up an argument with him, he will agree with you on every point, you leave him and he will forget what you have said. Once in a while one of them will come over but there are many of them that are self-satisfied—that are stumbling blocks to the whole proposition. It is a fact farmers must organize or go out of business. We have trusts, jobbers, brokers and everything else to fight and the labor trust is the biggest and the most difficult proposition that we have to get along with. It is the hardest one we are up against at present and the hardest one we are going to come up against in the next two years.

In our county we have a farmers' exchange that has been organized a little better than a year. It has been a hard year to work out such a proposition and we have been up against almost everything but have done in a year's time a little better than \$2,500 worth of business, which has been done at a cost of \$800—a three per cent margin. That is not all we have done,—we have kept down prices throughout our county and have helped the farmers along that line. To illustrate,—last spring when corn meal was worth about \$80 a ton, we sent a carload into a locality where they were selling for little better than \$80. We placed a carload in there at \$60 a ton. That same day corn meal dropped in that locality to nearly our price. It has worked out that way all along the line. The dealers have found out that when they get above such a price the farmers will turn to us for their feed and if it does go above such a price we do handle it, and handle it for the benefit of the farmers.

We are selling maple syrup at the present time through a Providence, Rhode Island, Exchange. The producer turns his syrup over to us and we are getting for him \$3.25 a gallon.

We are going to have a few certified seed potatoes not as many as we expected last fall because of the fact that the rust and the late blight hit certain fields that we had counted on. There is a great demand for seed potatoes in the south and it would be a splendid idea for the farmers of Vermont to make a specialty of raising seed potatoes.

The Maple Sugar Makers' Association has been in existence about 26 years and at the present time 20 percent of the maple sugar product in this country is advertised as being made in the State of Vermont and about 80 percent of the entire product in the country is sold as pure Vermont maple syrup. Looking at it from a business point

of view it seems as if something is wrong here and that the Vermont Maple Sugar Makers' Association ought to get onto their job and see to it that not over 50 percent of the maple sugar product made out of the state is sold as pure Vermont maple sugar and syrup.

I think this could be handled all right through the different exchanges if you had faith in the exchange and would be willing to hold the goods until later in the season and not turn them all onto the market in the spring of the year. There are a good many of you who have regular customers and get probably all your goods are worth. A large percentage of the maple product is turned onto the market early in the season and those who send their products to the commission merchants have to take whatever they see fit to send. The producer has no control over the price; there is no established price. It looks to me as though one well paid man (and it will take a good man to do it) to look after that end of the game and to co-operate with a farmers' exchange could accomplish much. I know if a man wishes to keep back his products until late in the season there would be no trouble in his getting 75 or 80 percent of the value of his money for these goods. I believe if you have the right kind of a man to look after this matter and at the same time look after the matter of advertising the maple product of Vermont, much progress can be made. The Ohio sugar ought not to be branded as a Vermont product; New York state should stand for its own product, and we should not have the benefit of it—if it is a benefit. I should recommend to the Sugar Makers' Association that they act as an association in this matter. I would also advise that the Sugar Makers' Association advertise to a greater extent; I don't think there is a third of the farmers that knew about this meeting here from anything that has appeared in the papers or any notice that has been given. I would recommend that the report of this meeting be in the hands of every member in the course of a month or 6 weeks so to be read before the next season's crop comes on. I think we could use this report to better advantage then than a year after the meeting.

One thing that has been of interest to us in our exchange and that has worked nicely is the note system. Last spring when we started out we did not know what we were up against. It was all new to us. We had a lot of orders for chemicals, fertilizers, feeds, seeds, etc. One morning I received word from Montpelier that there were drafts for between \$7,000 and \$8,000 for material that had come in and must be unloaded in 2 days. No provision

had been made for paying for it but we did not pay demurrage on that stuff even though it took some hustling to bring it about. That occasion gave us an idea that something had got to be done about financing the matter. We arranged with the different banks in the county for a note system. As it is today when a man gives an order he signs a note; if he wants to pay that note when he gets the goods he may do so. It is written on demand, or if he wishes he may let it run for 30, 60 or 90 days and make it in three payments. We turned over a list of the names of the farmers to the bank and they went over the list and marked the standing of each individual. The man who is marked "slow" or "doubtful" is requested to get someone who is good to sign with him or make his own arrangements with the bank before we will accept his note. In that way no one is under any obligation to anyone else. No one is on anyone else's paper and in this way the association or exchange is protected. This proposition has worked out finely. Upon the arrival of a car the drafts and notes are put into the bank to raise money to pay that draft and when the parties come for the goods they can pay cash or they can pay in 30, 60 or 90 days, according to the way the note is made out.

On our cotton seed, it takes about 2 months to get a car here from Baltimore. If a man ordered 1 or 2 tons and was obliged to send cash with the order he would be out that amount of money that length of time. This note system has proved very beneficial to the farmers. We have unloaded something like a dozen carloads of feed and have 5 or 6 more carloads on the way.

AFTERNOON ADJOURNMENT.

TUESDAY EVENING SESSION.

Session in charge of Vermont Holstein-Friesian Association, Mr. Gregory presiding. Moving pictures were shown of the New York milk show, also those of Cabana's celebration auction; music was furnished by Misses Fennell and Canning.

MR. GREGORY: How many of you realize that the State of Vermont, for its population, is the strongest dairy state in the United States. It has more Holstein cattle, more breeders of Holstein cattle, more members of the Holstein-Friesian Association of America, for its size, than any state in the Union; it has more breeders of Jersey cattle, for its size, than any state in the Union. One of the records that has recently been made I think you all ought to know of; many of you do already—that is the record of Tilly Alcartra and I am going to give it to you:—

ay record in 8 mos. er calving	90-day records		100-day records		Semi-official yearly records.	
	Butter	Milk	Butter	Milk	Butter	Milk
	360.07	8793.9	396.83	9702.8	556.20	14837.2 (285 days)
					841.22	21421.3
					1189.03	30451.4
63 3986.9	361.30	8803.7	397.37	9790.4	1190.46	29826.6
					1042.20	26814.8
					1322.00	33424.8
	Total production for 6 years.				6141.11	156776.1

During this time she had 6 calves and including all the time she was dry, she averaged for the six years.

Butter,	per day	2.8 lbs.
Milk,	per day	71.5 "
Butter,	per year	1023.5 "
Milk,	per year	26127.0 "

I am not going to detain you any longer but am going to call on Mr. Brigham to say a few words. You all know Commissioner Brigham of our own State.

MR. BRIGHAM: Mr. Chairman, Ladies and Gentlemen:

I did not come here this evening to make a speech but Mr. Gregory kindly asked me to say a few words and I always feel that I should be at Mr. Gregory's command.

Mr. Gregory referred to Vermont as a great livestock state. I hardly think we appreciate the importance of livestock to the state of Vermont. I hardly think we appreciate how well Vermont ranks with the other states in the union in the production of livestock. Dr. Smith of the University of Pennsylvania wrote an industrial and commercial geography and by a series of maps (upon which were shaded areas) illustrated in the different states the production of livestock. It will be of interest to you that Vermont is one of 6 states having the most livestock per area and one of 4 states the most dairy cattle per thousand population.

At the last meeting of the Legislature we had a law passed to take a census of livestock, of pure bred sires, etc., and we found in that census what I called something of a tragedy. We sometimes run across tragedies in unexpected places. I came up from Washington one night last summer and on the trip was visiting with a young French aviator who had been seriously wounded. He said as the wounded soldiers were convalescent in the hospital they were bothered a great deal by old ladies coming and asking them a lot of questions and sometimes they became very tired of the practice. He said one day an old lady asked him what an aviator did when he was up in the air and his engine stopped, and he says I told her that the air all above Verdun was just filled with airplanes that got stuck up there because their engines stopped. And that was one of the tragedies of this war,—those poor fellows up there and can't get down because their engines are stalled. This census revealed the fact that we have but 3,400 pure bred sires in the state of Vermont. We have about 32,000 farms and nearly every farm is a dairy farm and yet only about one-percent of these farms have a purebred sire at the herd's head.

You and the other breed associations have in a great measure I believe to get that number up to 30,000. We have a great market to the south of us for all our surplus stock,—Massachusetts, Connecticut and Rhode Island. The conditions prevailing in those states send buyers to Vermont and they are coming in the future to replenish their

herds. We ought to supply them and we ought to breed better stock; we ought to have purebred sires at the head of every herd in Vermont. I hope you will accomplish that mission.

MR. GREGORY: We have with us this evening a gentleman who is known all over the United States better, I think, than in Vermont—and I hardly think you know that you have this gentleman living with you and only a few miles distant from Burlington. I have great pleasure in introducing to you Mr. J. M. Kelly of Williston, Vermont, Chicago and everywhere else in the United States as well.

Mr. Kelley told the dairymen that was the trouble with them as only a dairyman knows. He started off with a sort of an air-gun bombardment of the methods or rather lack of methods of the dairymen and wound up with a verbal barrage of the "Busy Bertha" type. For range and accuracy he had his listeners wondering where his next spoken shell would land. His address follows.

ADDRESS OF JOHN M. KELLEY.

Ladies and Gentlemen:—

I esteem it indeed a privilege to be invited here tonight and to come into the company of the dairymen of this state. One feels that he is getting into the companionship of dairy aristocracy when he comes into Vermont. Personally, I find much pleasure, but not a burdensome amount of profit in living in Vermont. It has been truly remarked that considering the extent of the territory of this state, its population, and the number of cows kept, that it ranks one of the first. There is another thought that might well be made in that connection. It is, that dairying is about all you have in Vermont. Other states may alternately turn their hands to general farming or crop raising where the resources of the state warrant, but in Vermont you are limited to the products of dairying, with but slight mixture of agriculture.

We are approaching a new industrial epoch in this country, particularly as regards the dairying interests. The war is just over; the demands and needs for milk consumption are not only multiplied, but the cows of Europe have been killed off. They report that milk brings astonishing prices in Italy, and horse flesh is bringing astonishing prices in Russia. They have fewer cows not only from which to get milk, but from which to breed in Germany and France, and the amount of stock has been depleted in England.

In normal years I think we exported in foodstuffs about 6,000,000 tons. The last year of the war there were exported a little less than 12,000,000, and now comes the demand that America shall produce and export as much as 20,000,000 tons in 1919. Yet in the face of that fact, we find right now in New York and Chicago, city officials, unacquainted with the needs of dairymen, trying to put them in jail because they seek to get the cost out of their milk when they turn it over to the consumer. How are you going to square yourselves with the needs of the world in supplying milk when you cannot correct conditions here at home? Until dairymen sum up their own failures and

begin to employ methods found necessary in other lines of business, we may expect nothing but failure and distress.

I don't come here with a sense of having anything new to tell you. I am in the presence of men who have devoted the greater part of a lifetime to dairy interests. I feel honored in being able to share a platform with such men as Mr. Brigham, Mr. Gregory and Mr. Houghton, men of reputation throughout this country, and of international reputation; but I hope that what I say may arouse and intensify the interests of the dairymen in their own affairs so that the dairy business may be put upon a sound basis that will warrant a promise and a return, the same as other industrial and commercial enterprises enjoy in this country. You have failed to take into consideration the agencies that speak for success in regard to your business. In criticising the dairymen I am including myself, because I am engaged in that business right here in your vicinity.

What I have to say will bring out these points: First, that the dairymen today are deplorably unorganized, standing in their own light, covering up their own grievances. The dairyman has failed to acquaint the world, and particularly the consuming world, with his needs. First of all the dairymen must have organization. Second, the dairymen should have state aid and federal aid. Both the state and the nation should be aroused to a consideration of the needs of the dairymen of this country. There should be an enlarged department of dairying at our national capital, with a place for a dairyman in the President's Cabinet. There should be a wider scope and field of operation for the scientific dairy talent in the state capitals and universities everywhere. There should be a campaign of education to reach the consumer. You should take the consumer into your calculations and into your confidence. That should be followed out along the line of advertising, the greatest and only efficient method of education in this country in connection with an industry having to deal on a large scale with production, distribution and consumption.

When I speak of these it involves the necessity of having money to do with. I have no axe to grind and no one's brief to hold except the dairymen's, but you cannot get something for nothing. However, the money that it will require to finance the dairy interests of today will not come out of the dairymen's pockets. It is overhead charge and should come out of the consumer. There are consumers undoubtedly within my hearing now who figure perhaps that that statement is entitled to some censure. It is not so. When you go to buy a suit of clothes you are paying

the overhead charge, the advertising charge, and other expenses that go into the business. The same when you buy shoes or buy meat. But when a quart of milk is laid at your door there is an attitude of resentment on the part of the purchaser because you are paying more for that now than probably you have ever paid before. You are not paying nearly enough for that quart of milk today, measured by the needs of the dairymen, or by any business standard of other lines of industry. When a farmer buys his machinery he pays an overhead charge. When he buys tools and implements and dairy utensils he is paying overhead charges, but he has never figured an overhead charge for himself. There is not any industry in this country that, in its formation, does not take account of every detail that measures liability plus a safety margin. They figure items of cost, of maintenance, the cost of getting their product on the market, depreciation, insurance, and the cost of advertising the business. If they don't calculate on these elements the business won't live. I challenge anybody to show me any line of industry outside of the dairy that can go into the competitive field, and live, and disregard these essentials. If they conducted their business the way the dairyman runs his, there would not be a single solvent concern in the country today. They would be hopelessly wrecked. How does it come that the dairymen survive? It is because they have been consuming unearned increment. They have been robbing the soil, the pastures and the forest. Because they have been working 12 to 16 hours for a day that other industries measure with eight hours. Because the dairyman has been blindly producing something he knows not the cost of. He has never figured his labor, nor that of his wife, as worth anything. Because he lives scantily and denies to himself and his family most of the comforts and luxuries that those in other industries and homes enjoy. But when you come to consider the dairy business you discover that the dairymen of this country have never gotten together with their cards on the table and figured the cost of production, of up-keep, depreciation, loss, wear and tear or insurance. There is not one man in a thousand, (likewise his father and his grandfather before him), engaged in the dairy business who can tell you what it has ever cost him to produce 100 pounds of milk. He doesn't know. He has never figured overhead charges nor depreciation. It is only recently that scientific men have established formulae in determining the cost of producing milk, that the dairymen should tie to, in seeking to establish correct prices for their product upon the market.

Many times the dairyman reminds me of the ostrich. Whenever the weather is fine and the sun shines, the ostrich carries his head high, is fleet of foot and not a care infests the day. But when the storm clouds gather and trouble is nigh, or dangers lurk about, the ostrich sticks his head in the sand and leaves his body a target for every arrow that is spent. This is not unlike the dairyman. In the summer time when, without thought or effort on his part, nature tempers the winds and calls forth flower and vine; the trees are green and the meadows succulent and fresh; the cows are coming home with expanded udders, and the milk pails are brimming—it is then the dairyman smiles and becomes lord and master of the realm. But later, the drought comes on; part of his crop fails; winter time comes, and disease may creep in, a cow or two goes wrong. The dairyman does not feed a balanced ration, and is losing money. The competitive companies squeeze him, and he is found working against co-operative companies. It is then he sticks his head in the sand and, like the ostrich, lets every contender in the world take a whack at him. (Applause). He is the supreme ostrich of the world!

The dairyman might just as well face the truth. He has had his light under a bushel. He has stood in his own light since America was discovered. It is never going to do him any good to try and establish a business unless the agencies that contribute for and against its success are known and recognized. The farmer produces a quart of milk, and the distributing agency, in which he neither shares nor controls, delivers it at the back door of a consumer. Because the price is higher this month than it was the month before, a complaint is registered. It reaches only the middleman. He shifts the burden on the farmer and indicates to the consumer that it is the producer that is getting the profit out of that milk, and not the middleman; and that practice has gone on until the consumer buys his milk, believing the farmer is making barrels of money and charging exorbitant prices. What are the actual conditions in the dairy business today? We find barns absolutely deficient in equipment. We find them in need of repairs. I can take three barns out of five in this state and find that that percentage is deficient in the amount of light. They have no proper ventilation. They have cows that ought to be weeded out, cows that are growing old, and are no longer profitable. A certain percentage of young heifers never make good. Disease and garget and abortion creep into your herd. Your horses grow old and wear out; your harnesses are wearing out every time that you hitch up. Your pasture eventually

wears out, and your land wears out, and your cows wear out, and believe me, sooner or later the "old man" and the "old woman" wear out.

You complain because you are short of labor. You are short of labor because you have not made your farm as attractive to labor as the employer of labor in the city has made his business. Because of the shortage of labor, or because labor was not attracted from the cities to the farm, you have taken it upon yourselves to establish, not an eight hour day, but a sixteen hour day not only for yourselves, but for your wife and children, month in and month out, year in and year out. Every time you go to the city you find your city dweller and companion turning on his electric lights, with spare time for reading and recreation, his house equipped with modern plumbing. You go back home and find only the lamp and lantern; you have no plumbing in the home, and there is not one house in 100 that has a furnace. You have not advanced one step from where your grandfather left off. You are unorganized, and you do not get enough out of your farm to put it on a paying level and enjoy, relatively, the accommodations that the dweller in the city enjoys. You are entitled to these. There is not a man in the world, like production considered, that labors as hard for a dollar, and contributes as much labor for nothing, as the dairyman. The income blanks that are sent out by the government always give a man the benefit of a labor income. What is your labor income? Sixteen hours a day, and at the end of the calendar year, if you take into consideration depreciation and wear and tear and loss, and upkeep, you are probably growing poorer year in and year out. You are robbing the land and the pastures to play even. Not only that, but the industry is discordant and without co-operation or co-ordination. I need only cite a few instances of absolute proof. How many of you dairymen here today, outside of the so-called professional dairymen, how many of you are feeding a balanced ration? How many of you, last summer, stored away the feeds that were necessary to tide you over the year? And how many of you called upon your department of agriculture or county agent to have them balance your rations so that when you paid out money for feed you got that which brings the greatest returns, and enables your cows to do their maximum? Failing not only in that, the consumer has been left out of your calculations absolutely. It can't be done. The dairy business of this country will never progress until you connect the link between the producer and consumer. It may not be necessary for the producer to own and operate

the distribution; but it is necessary to have control of the agency of distribution so that the producer may know something about the handling of his product from the cow to the consumer.

The agencies that count as remedies in this matter I believe first to lie in organization; second, in advertising. We must have organization if the dairy interests are going to accomplish anything; we must have a common plan that will bring in all, and in which all may see a result. We have got to have formulae established, upon proper calculations, in figuring out the cost of producing 100 pounds of milk. Then, we need in connection with that, state and federal aid that will mean something. There are many things that may be done. Appropriations are made for this and that, the pork barrel, the harbor, experimental purposes, for education, and medical institutions. Yet there is nothing so essential for growth and development, physical and mental, for the maintenance of human life, as the milk you dairymen are producing.

In Vermont you have a member in your legislature from every township, while in most states the territory that sends a representative to its legislature is made up of a wider zone, bringing in one or more cities. Yet right here, where your legislature would be above 75 percent dairy representatives, what are you having done? You need aid in the question of eradicating tuberculosis, and you need it bad. That problem is in the hands of very able state officials here, but they and you need aid. The health of the child and the welfare of the dairy are seriously involved. You need co-operative dairies in this community; you need such co-operative dairies as Mr. Edwards is building up in Richmond and at Shelburne, and Mr. Edwards tells me he is trying to associate co-operative companies to establish wholesale markets in the big cities so that the producer may handle and store and market milk. You need aid in that. These co-operative companies should have feed warehouses. The state can furnish the means to have scientific men balance rations and go about the state. Bureaus should be established, of national extent if necessary, to buy feeds in order to economize and cut down the cost of producing milk. These warehouses cost little. They would turn the middleman's profit back to the dairyman.

There is no reason why the state could not aid in standardising the equipment, controlling the distribution, necessary in installing systems of ventilation, and also the disinfectants that you use. Your state can provide education and bring home, through your teachers, lessons on food

value of milk so as to reach the consumer everywhere. Teachers in the country schools should conduct a course on feeds and feeding, the balanced ration, and some rudimentaries on the items of cost that enter into the production of milk. Professional men of this country, the doctors and dentists and nurses ought to have carried home to them the message that they are a part of the processes that make for the building up of the dairy industry, in order that the consumer may get better milk, and the child receive better nourishment. The doctors and nurses and teachers in home economics and domestic science, and our college professors and county agents, specialists and scientific men like McCollum, who are qualified on the subject, should all be brought together and aroused to the necessity of some sound plan, and co-operate with you to put the dairy business on a sound footing, so that you will know the cost of production and know what you will have to charge the consumer to keep your business going. (Applause.)

It is shameful to see that we have dairymen who are shouldering your burden, John Browns if you say so, who are under the charge of conspiracy today through men who sit in district attorneys' offices and know nothing about the dairy business. They have put you men under the suspicion of seeking excessive demands for a product that they know nothing about. But they can hardly be blamed. The dairy business has been left to shift for itself so long, that the world has lost faith in it. Dairymen themselves have lost interest in it, and many of them patronize independent companies, enriching themselves from your product, delivered right into their hands, after you have produced it.

Through the medium of advertising what can be done? It is the one agency and factor in bringing success to the dairymen. There is not an industry that has a product to sell that does not first count upon the cost of advertising that is necessary to bring that product home to the consumer. One of the most important means to the dairymen in advertising will be the use of the billboards and various forms of outdoor advertising. Never having employed a sufficient amount of advertising the dairyman is in the dark as to what he might accomplish. But you cannot name me one concern,—even these concerns that fight shy of the Sherman Act and dodge the Federal Trade Commission, to protect and put an unknown quantity on the market,—that has gone into the correct field of advertising,—but what has made good. Yet you have failed to employ these agencies and don't know what they will do for you.

The billboard is the quickest medium, I believe, that we have. It is ready in 24 hours and it covers territory that you want covered. In that territory, bounded on the west by the Mississippi, and on the south by the Ohio and the Potomac Rivers, lies substantially the dairy-producing and milk-consuming territory of this country. So that the extent to which the dairymen need, at present, advertise is limited, compared to the extent to which other concerns in the industrial world are compelled to advertise to get their product before the consuming public.

A short time ago we had the packers of this country called before the Federal Trade Commission in Washington. We find these packers chafing under the collar at the criticism that the Federal Trade Commission, after extensive investigation, pronounced upon them. And what do they do? They advertise. They advertised to counteract its effect before the bar of public opinion. The packers were not like the dairymen—unable to state the cost or profit on their product. They were able to say to the fraction of a cent. They attempted to justify the millions made in by-products, by diverting attention to what they made per pound on meats. Page after page of the newspapers carried tremendous advertisements by packers to reach the consumer. They wanted to reach the consumer and mould public opinion. They have employed the medium of advertising to do it, and they will accomplish it because the public wants to be impressed. It reads and observes and it is always open to impressions from exchanges employed in advertising.

There is not an institution in the world so advantageously situated for advertising as is the dairy industry. Automobile concerns, packers and others who employ billboard service can get this only in the cities where the boards are. Landowners along the railroads have generally refused the erection of signs, and the farmers won't let these industries plaster up their barns. But let me ask you, as to your own business on your farms that lie along the railroads from Chicago to Boston and New York, along lines carrying millions and millions of the readers and thinkers in this country,—where are your signs and attractive advertising, carrying the dairymen's message home to the people? There are none, not one. And yet you expect results. Results from what? The consumer has never been taken into your confidence. They have no understanding of your conditions. Where are they going to get it? By advertising. I can bring you in touch with men who will tell you the cost of putting the paper on the boards,

cost of construction, and the cost of painting, either on metal or wood. There ought to be a splendid sign on every farm adjacent to the railroad between all the large business centers of this country,—advertising in a correct manner and in an attractive way the food value of milk, emphasizing the farmer's needs and the consumer's requirements, and carrying home a full and faithful message dealing in facts and giving the square deal to everybody. (Applause).

The newspapers are no less important than the billboards. There is not a highway in this country today that does not have available along its sides, and on farm buildings, very attractive places for a sign that will acquaint the public with the fact that you are a producer of clean, wholesome milk; that the farmer has purebred animals; a purebred bull, and a mention of the milk record of his cows. Just as soon as you draw the attention of the traveling public to these things you have called their attention to dairying, and to you, and your business. At every four corners in this country you ought to have signs, appealing with splendor and attractiveness, carrying lessons of importance, to stimulate the interest of the consumer and refresh his desire to use milk.

The newspaper man is not given the opportunity to make the display that he is willing to make for the dairymen. I have opportunity for considerable observation in these things. Take the circus for instance. Every artery of their life lies in advertising. Say a show is going from Burlington to Boston, and there is a washout. They can't make the regular route and have to detour to Albany. What are you going to do? They may have but 48 hours to make their coming known. They advertise. And in 48 hours, through the medium of advertising in the newspapers and on the billboards, they will attract the attention of the women and children and the men, draw them from their homes and offices—draw the farmer from his plow and the dairyman from his cow to come and see something that 48 hours before he knew nothing about. How? Through advertising.

There is another means that they have. They employ press agents. A press agent is a student of human nature and the art of advertising. He understands the city editor. He understands the traveller who reads and observes ads. He understands the parents, and the child and picks up an evening paper, and the stories that they like and that they don't like. He understands the editor's point of view when he comes in with an ad. He knows what humor and charm and color will do. He knows how to make a picture attrac-

tive for the baker and the prepared story interesting. He has stories upon metal and some upon paper, and these same stories are being handed out in different towns simultaneously. These stories go out into different homes, with the result that it is wonderful what is accomplished and the things that are done through these mediums. You mould opinion and educate, and get people to think along these lines and bring home a message. I wouldn't care for an advertisement that just advertises a cow,— it doesn't mean much. You have got to have something new and novel in your advertising. It must have color and charm and a bit of wonderment to draw people to it. To put up a picture of just a cow won't attract much interest or study. But if you saw a big beautiful sign picturing a cow jumping over the moon, and spilling Holstein milk all over the world, you might look and think and ponder. If you saw an advertisement of a circus coming to town that said just "Circus" you wouldn't look at it much. But if you saw a giant tiger ready to jump, with jaws open and fire and terror in his eyes, you would look at it, and bring the wagon to a stop while you and your family drank it in. You would do it because somebody was a student of human nature and knew his business. But you never saw anybody standing in front of a billboard reading of a cow, because you never placed one there.

When the United States got into war what did it do? Hired a press agent and advertised. You didn't know they had press agents for the civilian, the Army and the Navy work. What do you suppose it was that they did when they wanted food saved? Just the words, "Save Food"—No. There were press agents put to work. They got the artists to design big posters and signs that they heralded all over this country, and placed in your window and in the hotels, and in the newspapers and on the billboards, and in the dining cars and restaurants. Some people regard a press agent like the fifth wheel of a wagon. It is business acumen. That is what press agent spells and that is why you need them. Suppose you gave Tilly Alcartra to a press agent to develop. What would he do with her? He would have you going to bed dreaming about her and begging, when you got up, for a quart of her milk. He would probably picture her on the Boston Common with a comely milkmaid at her side starting a stream of milk. And if you will sit down and figure it out you will find that with her production for a year of over 3,300 pounds you can squirt a stream of milk from Boston to San Francisco. (Applause). And after the press agent had that stream

of milk spread over this country he would have outstretched the tongue of every living consumer to get a lap of it. (Applause).

Dairy interests will never be established on a substantial footing until the farmer recognizes that he must bring home a message to the consumer. The only way you can do that is through advertising. You can advertise impractical things, and advertise a man into doing things against his best judgment. When this country entered the war and recognized a food shortage, it started a campaign of saving food. Everybody wanted to help, but everybody did not know how. The government advertised to teach how. Likewise it said, "Grow something", "raise something", and the first people that it reached were the women of this country. They were induced to dig up their back lot and grow something. You know it was not 60 days until you could scarcely find a woman that was not rushing down town for seeds, or carrying a hoe. Every woman with a patch of ground as big as a bedquilt was spading and farming. It was impractical. The soil was not adapted or fitted for what they planted. It was energy lost. But it brought home a valuable lesson, for if you advertise intelligently you can get people to do almost anything.

I picked up a paper about a year ago that contained an article where somebody said the way to get around the high cost of living was to take a churn and churn milk into butter to make the butter go farther. That fellow never saw a cow. You dairymen know that the only way you can make good butter is to get the milk out of it. But now comes some correspondence school dairymen in an office, who never saw a cow, who says that the way to provide good butter is to put the milk back into it. Shortly afterwards I went into a large department store in New York and saw on their hardware counter a tremendous array of little hand machines. I never had seen these before, and inquired what they were. I was told they were for driving milk back into butter! Some live manufacturer read the article that this life saver wrote on reducing the high cost of living, and took time by the forelock. He figured that if they manufactured enough of them, and sufficiently advertised those machines, they would get people to buy them, and when I was in St. Paul last week and had occasion to visit at three separate homes, I found that every woman of them had read the ad. and bought one of these machines for putting milk back into the butter. (Applause). Yet you people won't advertise or hire a press agent! You do not know what a tremendous power you are if you ever get

aroused. One of the greatest forces in the world, and yet so hopelessly unorganized that you know not the cost of your own products, and have never educated the public to recognize your needs. Success is at hand if you only reach for it. Agencies can be accomplished working through co-operative creameries and state units to get this advertising before the public. We can get state and federal aid. Acquaint your congressman, and representatives in the state legislature, with your own needs, so that when they go to Washington and Montpelier they may, instead of nursing political aims, think of the men back home, and when these congressmen and legislators return let them answer before an anxiously inquiring dairy public.

Some people say dairymen won't stick, won't stand together. I deny that. I believe that when you arouse the dairymen to sense a common plan in which the results are self evident, that you cannot pry him away from the proposition. He will stay with it to the end. I heard them say that in Wisconsin, in years back when the corporations were in complete control. The railroads figured that you could never get the natives to stand together. But history now refutes that. The people did stick together when they became once aroused to their needs and were offered an intelligent solution. What Wisconsin put, as a pioneer, upon the statute books was copied all over the Union as a model by other states. I learn that here in Vermont somebody contemplates a bill to take from the statute books your primary law. Do not permit it. It is the one alternative that you should have and preserve.

I want to touch upon the question of farm wages. There is not a man of you who came into this meeting today that has not felt the drain upon his business of the present day farm wages. You probably figure that you are going to hire cheaper labor. You are not going to do it. Why is help scarce on the farm today? You are largely to blame. You have made dairying less attractive than the employer in the city has made his work, and you have not given labor on the farms the accommodations that it enjoys in the city. And until the time comes that you can bring a man to your home and turn on your electric lights, and have plumbing in your house, and furnace heat, and hours that are liveable, and a library from which you can choose a book for your instruction and that of your family,—until you have brought about those things on the farm you are not on a common footing with your city dweller, and you cannot compete with him. You have got to bring home to the dairymen a recognition of his needs, and get a price for

your milk that will enable you to obtain relatively the comforts that the city dweller enjoys. Why do your children leave home? There was never a greater mistake made than when farmers worm into the minds of their children the thought that the farms are not good enough for them. At a dairy meeting in Wisconsin the other day, a man said he was raised on a farm. He was the only boy, but there were several sisters. In his boyhood days the mother regarded farming so repulsively that every tool and piece of machinery about the place had to be gotten out of her sight. The girls were taught to regard farming and dairying as a menial service, beneath their level, and that sooner or later they should divorce themselves from the life of the farm. They carried on that way until the "old man" died, and the mother and the girls moved to town. These two sisters today are nervous and physical wrecks. Across the road from this family lived a German, who, aside from a common education, taught his daughter to get out in the morning and milk. She milked in the evening; she helped about the house; and, this man said, "Today when I look back what do I find? My two sisters who were taught to do nothing, are physical wrecks, while the girl who was taught to work and feel satisfied with her lot in life, is a fine healthy specimen of womanhood." We should get into the youth the spirit of labor and usefulness, and contentment, so that there will be created on the farms an interest in developing advantages equal to the things that they enjoy in the city.

There are a great many things that I would like to touch upon from the standpoint of advertising, if time permitted. You spend nothing for advertising, know nothing of its results, and little of what can be accomplished. Men like Mr. Brigham, Mr. Gregory, Mr. Houghton and Mr. Hoard have been carrying dairying as a dead weight the better part of their lives. Lofty of purpose, devoted in their work, self sacrificing, they have been carrying along your interests until they have got to a crucial period where they need help. All you need to do is to arouse yourselves to the point of recognizing your own needs and follow their advice, and keep in mind just this: Don't ever get too tired or too indifferent to respond. Not long ago, it is reported, in the trenches there was a white man in command of a colored regiment. He had taken them for a tremendous hike over the country, until they were worn out. Recognizing their situation, he lined them up and said, "Boys, all of you who are unwilling to go out for another 20 mile hike, take two steps forward." The line all moved up but one,—a big burly black. "Mose," asked the Captain, "are

you wanting to take another 20 mile hike?" "No, Cap'n," said Mose, "I just aint even able to take those two steps forward." (Applause). Now, these pioneer dairymen have officered and carried you for 20 year periods to try and accomplish something in the dairy business. I hope there are none of you here now, when the iron is hot, who are just too blame tired to get up and take two steps forward. (Applause).

There is another little incident I may be pardoned for reciting: A regiment had been tried out pretty hard against the German line and seemed to make little headway. One day a nigger came up and said he would like to get a razor. "But," the officer said, "We don't fight with razors in this modern warfare." Finally the nigger got the razor and went out over the top. When he got into contact with a German out came the razor, and zowie!—he made a clean stroke. The German looked mystified, but said; "You never touched me," and the nigger replied, "The hell I didn't, just shake yo' head and see if I didn't." I might draw the parallel that if the dairymen of this country would but wake up and shake themselves, they would find that they have been going around for years without heads and didn't know it.

I picked up a newspaper recently carrying the advertisement of a dentist, picturing the heads of three savages, to draw the conclusion that civilization destroys the teeth. This is misleading stuff handed out to a gullible public. To disprove it, just consider the dog of the savage. The dog of the savage and the dog of the so-called civilized man of today, each has a perfect set of teeth. Why? Simply because the dog in each case received food that developed and preserved bone and tissue. It is the lack of civilization in our communities that is responsible for bad teeth. There is one element necessary to grow perfect teeth, and that is lime. There is no article of food in which lime is contained in such essential or available form, as in milk. Because people of today have been denying their children the necessary amount of milk, the resistance in their teeth has broken down. We have given them bad teeth and bad tonsils and poor development, and increased the dentist's and doctor's bills.

On your billboards you need signs such as these:

Use More Milk
Give Growth and Health Development to the Child by Feed-
ing More Milk.
Give him good teeth.
Do away with dentist's bills.
Reduce doctor's bills. etc., etc.

Advertise. Make your business respected and known. It will bring back love for the old farm and the old cows. It will brush off the cobwebs from the windows of the barn, as well as brain, of the farmer. The farms throughout the New England States are the greatest dairy centers, and yet you are dairying unsuccessfully. You try to compete with the farmers of the West with the dual purpose farms, and they may have income from either grain raising or dairying. Our farms are farms of abandoned management. You will recognize this when you put dairying on a competing basis. I don't think there is any vocation in the world that is as closely in accordance with the divine plan, as the farm and the dairy. If you feel that way about it and cultivate the right spirit, you will progress. You have labored long and never considered the labor income of yourself or your wife or your child. You have never complained. You have never organized. You know little of what the criminal court means. You don't know what monopoly is, as defined by the Federal Trade Commission. You don't know what the Sherman law means. You have been too busy producing the necessities of life that are nourishing the rest of the world. I trust that under the patient leadership of the many men devoting their time to it, you will accomplish results along the road of co-operation, and that in the words of Omar Khayyam, you may be able to sing:

A loaf of bread, a jug of milk—and Thou
Oh, cow, beside me grazing in the meadow lands—
Oh, dairying is Paradise enou!

WEDNESDAY FORENOON SESSION.

FINANCIAL REPORT OF ASSOCIATION.

Receipts and Expenditures of the Vermont Dairyman's Association, 1918, M. A. Adams, Treasurer.

RECEIPTS.

Cash on December 1, 1917.....	\$ 228.64
State appropriation	1,000.00
Membership fees	47.00
For advertisements and for space sold in machinery hall	346.75
Total receipts	<u>\$1,622.39</u>

EXPENDED AS FOLLOWS.

A. H. Peters, stamps	\$ 20.00
Capital City Press, programs	125.00
W. B. Bullock, printing	3.95
W. P. Russell	14.12
Jas. A. Leach	17.30
Geo. H. Temple	19.48
Hotel Vermont	104.50
J. E. Dennison, lumber and labor.....	30.00
Orrin Bent, scoring butter	50.00
W. G. Reynolds & Co.....	20.80
Hayes Advs. Agency	9.00
Miss G. S. Smith, reporter	54.45
S. H. Lessor, orchestra	50.00
North Public Health Bureau	123.52
F. E. Duffy, speaker	42.00
F. H. Bickford	7.91
Mrs. Luella Bickford	6.68
A. W. Kimball, stamps	3.00
Bertha M. Len, speaker.....	15.50
Red Furniture Co.	2.25
B. Ford	2.00
N. Hawkins	2.40
E. Town	1.60

T. Lamb	2.40
A. Jenney	2.60
Bogle Bros., cups	21.90
M. A. Adams	18.63
A. D. Pease	2.18
W. B. Bullock	5.11
A. Bonazzi, stamps	15.80
Hotel Vermont	10.00
W. H. Harrington	21.43
The Opinion Press	31.00
O. L. Martin, Salary and expenses.....	207.48
M. A. Adams, salary as treasurer.....	10.00
Transferred to Permanent Fund.....	102.07
Total expense	\$1,176.96
Cash on hand at settlement.....	445.43
	\$1,622.39

PREMIUM FUND.

RECEIVED.

Orrin Bent, contribution	\$ 5.00
J. B. Candon, 50 lbs. butter.....	25.00
C. A. Eno, for 103½ lbs. butter.....	51.75
Vermont Experiment Station 47½ lbs. butter.....	24.68
Drawn from General Fund to balance.....	102.07
	\$ 208.50

EXPENDED.

Paid for 139 pounds butter at \$1.50.....	\$ 208.50
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Upon motion duly made and seconded the report was accepted and adopted.

VERMONT STATE FAIR 1919.

HON. JAMES B. ESTEE, MONTPELIER, VERMONT.

Mr. Chairman, Ladies and Gentlemen:—

I feel quite at home here this morning with so many of my friends about me and am glad to have an opportunity to speak to you on the wonderful subject of the Vermont State Fair for the year 1919, a subject that should have given it an hour at least and yet I have but 15 minutes in which to speak. As I say, it should have an hour devoted to it, to in any adequate manner set forth the merits of the enterprise.

The Dairymen's Association of Vermont was organized upon fundamental principles which, as they have been carried into operation, have produced this great organization, and the marvellous results which are the product of years of deliberation, experience and faithful work on the part of its members. I really never had known before how remarkable it was until I listened to the brilliant address last evening of the gentleman from Williston, New York, Chicago and elsewhere as the chairman introduced him.

I was pleased beyond measure with what he had to say in regard to the question before this organization and that the members were not giving in all particulars the attention they should to the great work they have before them and especially in regard to the question of publicity. The matter of publicity is the big question in which our Vermont State Fair is concerned. As I look around me I almost feel as though it were a meeting of the Vermont State Fair Association because I see my good friends Mr. Brigham, Mr. Adams, Mr. Dunsmore, your distinguished president and your secretary, Professor Bradlee and Mr. Taylor. All these people are either connected with our Association in an official and responsible position or else they have been identified with us in the way of helping to plan and execute in the years gone by and they have contributed in valuable service to the making of the Vermont State Fair such a success as it has been. I am glad that I have this opportunity to say just a few words to this large group who are representative men and women connected with the dairying and sugar making interests of Vermont.

The State Fair has for its purpose one thing, and one only, and that is that there shall be brought together the finished products of these organizations. This is true also as relates to the Horticultural Association which looks after the fruits and vegetables, the grains and other soil products, as well as the Forestry Association. The main object of the State Fair is to see to it that you shall bring together and exhibit the finished product of the brains, the hearts, and the blood representing the hopes, the aspirations and the activities of the men and women, the boys and girls, of the State of Vermont. These products are to be brought together and exhibited so that every citizen of the state may have an opportunity to look them over together, talk about them, think about them, praise or condemn them, as the case may be, according to the standard of excellency each has set up in his mind.

We have endeavored during the last nine or ten years to have such an exhibit in the fall, when the harvests were over, that would show in the most complete and compact manner what the intelligence and industry of the men, women, and children of Vermont have achieved, and in addition thereto what has been brought from New York, Ohio, Virginia, Pennsylvania, and Massachusetts; exhibits of stock—horses, swine, cattle and sheep—which our neighbors have been raising, so that you might receive inspirations from the results obtained on their part. It is true we have produced the biggest stock show at White River Junction, under the auspices of the State Fair, that has been assembled within the boundaries of New England. This year—1919—it is the plan of the officials to produce a State Fair that shall equal in every particular the highest point of achievement that has been reached in the past. We are bound to maintain the standard if it lies within our power and if we can “go over the top” a little further we intend doing that insofar as the stock exhibit is concerned. We want to make the 1919 State Fair the best fair that Vermont has ever had. We cannot do this except every man of you present, and I particularly address my remarks to every member of the Vermont Dairymen's Association and Sugar Makers' Association and the Forestry Association, do that intensive thinking and that co-operative acting from week to week and month to month that will bring about such a successful fair as we must have. By starting this early in the year you, and each of you, will have ample time to make plans, mature them, assemble stock, grains, vegetables, butter, cheese, maple sugar, and fruit in competitive exhibit.

In addition to what we have done heretofore this year we wish to establish competitive exhibits in all the counties. We want every county in Vermont to come to the State Fair this year with exhibits, showing what the respective counties in the State can produce and you will be expected to show your highest efficiency in this work. We ask your hearty co-operation along this line. We want all Vermont products there.

This is what we are trying to do and these men who are identified with you here today constitute the body of experienced men associated with me and we expect to bring to pass the things I have told you. However, we cannot bring to pass this result in any degree unless you co-operate with us. Here is the school, the high school, the college, and university whereby you drill and train and educate the men and women so they understand what this State Fair enterprise means and how best to prepare for it and best to judge the products we have assembled to make a competitive exhibit. We invite you to co-operate with us and as you return to your several counties, your several communities and towns, your several fire-sides, to your granges, your farm clubs and all your different organizations we ask you to remember the State Fair of 1919 and to realize that we have been forced by circumstances over which we had no control to let the State Fair go by for two years and this year it is going to be a hard task for us to assemble these things and make it what we would. We invite every man, woman, and child in the State to come and witness our work. It is going to be a Herculean task and for that reason we ask each one of you to help us and if you will do this we will make it the best fair the State has ever had.

PRESIDENT'S ADDRESS.

F. H. BICKFORD.

Members of the Vermont Dairymen's Association, Ladies and Gentlemen:—

We assemble here in the Queen City, the Association City of the State for the Forty-Ninth annual session of the Vermont Dairymen's Association, the oldest and largest Agricultural Organization in the State.

We may feel proud that the Green Mountain State originated a movement that has been copied by sister states, a movement that has been of great value to the dairy interests of our own State. We meet at this time, feeling that peace for the whole world is assured, and agriculture has been an important factor in helping to win this great struggle, the struggle to overthrow Autocracy and to establish Democracy. Our past year has been a trying one, discouraging farm conditions, the shortage of labor has made tired bodies, and heavy hearts have at times almost overcome our wills, but we have ever struggled on. History records the fact that in every walk in life, whether in Representative Halls, upon the field of battle, or in the professions, Vermont is ever at the front.

I hope in the future as in the past that history will repeat itself and that we may contribute to all things which go to make our State and Nation great.

EDUCATION.

If we are to teach our children rural education, city standards cannot be used, teachers must be raised and educated in the country in order to meet requirements.

There must be something radically wrong in an Agricultural State like Vermont, that educates the boys with the idea that it is better to leave the farm and seek employment in the city.

I believe the rural schools should have a course of study adapted to the boys that are so much needed on our farms, making the farm life attractive, so attractive and interesting that they will not want to leave the country, that the city will not call to them.

But as long as the course of study in our school is designed to prepare the student for college, and only 5% avail themselves of the opportunity, what about the 95% that wish to prepare themselves for a practical business or agricultural life? It seems to me that the small minority are allowed the privilege that belong to the great majority.

AGRICULTURE.

Agriculture lies at the foundation of all prosperity, it leads all industries in importance. What would have become of our Allies if the United States had not "gone over the top" with an increased production of food and a decreased consumption? While many other businesses have been guaranteed 10% profit above cost, farming the most essential industry of all, has had no guarantee whatever.

It is time now for the farmer to ask for and demand even if it is necessary, that agriculture be given the same profit and the same consideration in all respects that other lines of business are given, for, as one industry prospers all other industries prosper alike. We were told "that food would win the war." America furnished this food, and in so doing learned lessons in economy.

Now we are told that a larger amount of food even, must be sent to Europe to keep her people from starvation, we are told twenty million tons will be needed, three times as much as we sent in normal times.

Now comes the period of readjustment and while the price of the 1919 wheat crop is fixed, after that the price will be governed by supply and demand as in peace times, in fact we will find that the readjustment will go on and the lowering of the price of one commodity, will result in the lowering of the price of some other commodity that is directly or indirectly connected. Labor must and I am sure will adjust itself to the changing conditions, as the cost of living decreases the price of labor must decrease also. For the past year labor has been very scarce and price could not enter in, laborers are returning from war work now, looking for the position they formerly held. To my mind the readjustment of labor from war conditions to a peace basis, is the big job of the present time.

DAIRYING.

We look back over thirty years, back to the days of the coming of the Babcock Tester, back to the days of the first

Cream Separator, and we realize that knowledge put into use becomes of the greatest benefit.

The great need of Vermont is not more knowledge but to put into practice the knowledge we already have.

It is estimated that the dairy business of this country amounts to \$8,000,000,000 per year. There are 6,000,000 dairy farms with 23,000,000 cows on them, producing 45,000,000,000 quarts of milk per annum.

There are two sources of human food namely, land and water. 91% of food comes from the land and the balance from the water in the shape of sea food.

The dairy industry is the only one that takes food from the soil and at the same time puts back into that soil the elements it needs. The cow offers 19% of all human food in this country, it has been shown that this industry is the main source of human food, and it has lately been discovered that the fat in milk is indispensable to the growing child.

This year the dairy industry in Vermont will amount to over \$20,000,000 and while it is thought the amount of dairy products have decreased some the higher prices received will make up the difference.

About a year ago the New England Milk Commission was created by the Federal Government, for the purpose of fixing prices on all milk shipped to Boston to be sold as fluid milk.

This commission held hearings from time to time to get evidence in helping them to determine the cost of producing and distributing a quart of milk, the evidence being presented by farmers and their representatives as to the cost of production and by the contractors as to the cost of distribution, in this way to arrive at a just price to be paid by the consumer.

It was and is a lamentable fact that so few farmers knew enough about their business of making milk, that they were able to give figures taken from their own farming operations, to help this commission find the price that the farmer should receive for his product, supposed to be the cost of production plus a reasonable profit.

At one time I am told there were 2,000 questionnaires sent to the producers and only some over 200 were returned filled out for the use of the commission. In an example of this kind I think there is something radically wrong with the farmer. Not so with the contractor who had facts and figures to show all sides of their business and showing the weak places. If a farmer does not consider his business of producing milk of enough importance to show the cost of

conducting that business, how can he expect other people to watch over and protect that business for him.

When a farmer says without any figures to prove his claim, that the price of milk is too low and that he can not afford to produce milk at that price, where is his evidence to show that his loss is on the production of milk or in the production of some other crop, or, even caused by poor planning or lack of good business judgment on his part.

I claim that no man has a just right to be considered in the fixing of the price of milk unless he can show how much it has cost him to produce that milk. I claim that a man that is content to milk cows year after year not knowing the producing ability of his different cows, giving to each the same feed and care is at least a very indifferent dairymen and a poor business man. The consumer in the city ought not to be expected to pay an increased price for his milk so this man can afford to keep producing this indifferent milk, in his indifferent way, from these indifferent cows.

I don't suppose there is any of this kind of dairymen in the audience, but if there is, I hope you will think this over. These same farmers, in fact 75% of the farmers in my part of the State who claim they can not afford to produce milk or butter at the prevailing prices are using Oleomargarine exclusively in their own homes.

Now if these men can not afford butter of their own making at this price and are not loyal enough to their own business to use butter, how can they expect others whose chief interest is to cut down living expenses, to use butter at the high price in preference to Oleomargarine.

Now men let's get behind our business and be loyal to it, taking pains to know the cost of conducting our business and then when we have an opportunity to call for higher prices we will have some basis for our claims, taken from our own operations.

THE FARM BUREAU OF TODAY.

THOMAS BRADLEE, DIRECTOR, AGRICULTURAL EXTENSION
SERVICE OF THE UNIVERSITY OF VERMONT AND
STATE AGRICULTURAL COLLEGE.

The subject "The Farm Bureau of Today" was chosen because the speaker wants to discuss the organization as it is now being developed, without reflecting on the good work that has been done in the past and to dispel confusion of terms.

The Vermont Farm Bureau of today is the product, the outgrowth, the fruit of our experience extending from the time the first county agent was appointed. It is the plan that is being used in practically every one of the thirty-three northern and western States. We confess frankly that we have "begged, borrowed and stolen" parts of the scheme of organization that is now in vogue in the State. Such of these as we could we have adapted to our Vermont conditions. The others have been originated, worked and reworked, used or discarded as the case may have been by those who have been closely in touch with the work. The greatest progress in this direction has without doubt been made during the last year and a half. Undoubtedly great changes will take place in the future; hence, we will confine ourselves to the Farm Bureau of Today.

During this period of development the Farm Bureau has undergone many changes in personnel, structure, purposes, aims and ideals. The majority of these changes have tended to increase its effectiveness and usefulness to the people whom it is designed to serve. In general the principles of the organization remain unchanged, but there has been a decided attempt to simplify the working machinery.

The war period through which we have just passed has offered many ways in which the Farm Bureau could adjust itself to new duties and at the same time enable it to render a service in times of peace as a great educational agency. The most vital result in this development to date, however, is the conception we now have of the functions of the Farm Bureau, not in its relation to the farm alone, but in its relation to the farm, the home and the community.

When the United States Department of Agriculture first proposed to place agricultural agents out where they could come more closely in contact with the people, it was thought that local interest could be aroused and maintained if financial contributions were made toward the support of the work. Naturally, there had to be some local machinery to handle these funds, to counsel and advise with the county agent. These early organizations performed few functions other than stimulating membership dues and contributions from farmers, merchants and other public-spirited citizens and helping to secure public funds, Federal, State and County, for the support of the enterprise. Some county agents and their associates found in these organizations a means of making this great educational movement more effective. Not only could they, through such an organization, reach a greater number of people with their demonstrations, lectures, etc., but these organizations brought to them, and through them to the State Agricultural College and the United States Department of Agriculture, the viewpoint of the best and most progressive farmers as to what they thought ought to be done for agriculture in their several counties. As the efficiency of this method of conducting county agent activities with the organized cooperation of farmers became apparent, there was developed an organization, the Farm Bureau, not primarily for financial assistance, but for active cooperation in the activities of the county agents. This organization proved so important that some States adopted regulations whereby the formation of farm bureaus was made a condition precedent to the appointment of a county agent. Some even enacted laws making the organization of a farm bureau obligatory before public funds were available.

The war greatly impeded the movement and demonstrated immediately the imperative public necessity of local associations for effectively organizing agriculture for war. Results must be accomplished quickly. To do this, it was necessary that a means of reaching every community and each individual be provided. Not only this, but the farmers who were being urged to greatly increase their output must enter sympathetically into the work and assist in adapting the National needs to the economic conditions of the farm and community that all might perform the most efficient service. Otherwise, the patriotic impulse of the individual might respond to production propaganda in a way to bring disaster to the individual and ultimately retard, if not defeat, the cause he was trying to help.

With the United States Government and the States doing their utmost there was need of a stabilizing influence through which the farmers in an organized way might express themselves and effectively cooperate in satisfying the needs of the Nation and the World. With the United States Department of Agriculture and the State Agricultural College officials conferring and planning an agricultural production and conservation program, there was needed the counsel and organized help of the people who were to carry out the program. Out of it all there came the idea of the "farm bureau of today", not simply an organization to help the county agent, but, as leaders had long hoped it would sometime be, an organization to take a more active part as the final member of the agricultural "trinity" of extension agencies, the United States Department of Agriculture, the State Agricultural College, and the County Farm Bureau.

Thus far we have considered only county agent work and its influence on the Farm Bureau of Today. There are other factors which helped to broaden the scope of the farm bureau. Previous to the war, local extension work had been almost wholly in the hands of the county agent. He was the only joint representative of the United States Department of Agriculture and the State Agricultural College in the county. By means of his individual efforts extension work with men, women and children was carried on.

Previous to the passage of the Food Production Act, there were but seventeen home demonstration agents and only an occasional county club leader. The passage of this Act brought to each of these lines of work greatly increased resources and prospect of very rapid development. The numbers of these agents grew rapidly. At once there was a need for one local agency or organization wherein the entire extension movement in a county could center.

It has been recently been said that: "Extension work with rural people is essentially one piece of work in which the parts are intimately related and so interlocked that the interest of the whole must be considered in determining what is best for any of the parts. The interest of the farm, the farm home, and the productive efforts of the young people are so bound together and so interrelated that the plan of the extension work must be thought of in terms of the farm, the home, and the community, rather than in terms of men, women, and children or institutional departmental organization.

"These ideas were endangered by any effort which sought to emphasize the relative importance of the various phases of extension work. The desirability of one closely

knit organization is therefore apparent, wherein the work to be done will determine its relative importance, rather than any assumed importance of the local worker or equality of overhead supervision. To meet the acute conditions imposed by the war, and in order to adapt itself to the new forces in the local extension field, the farm bureau has during the last year undergone a modification that not only increases its usefulness, but in a measure changes its character, although its form is not essentially changed or its interior framework materially disturbed. The farm bureau has been plastic enough to adapt itself to these new conditions without the necessity of any radical reorganization."

The Farm Bureau of Today is the recognized agency through which the State Agricultural College and the United States Department of Agriculture cooperate in all extension work in the county, whether that work be with farm crops, farm animals or the problems of the home and community life. It has become a local institution, educational in character, for administering and directing the extension work in agriculture and home economics in the county, and for participating in plans for the inauguration and execution of such work. Through this farm bureau the people in an organized capacity have assumed the responsibility which properly belongs to them, viz., that of directly participating in determining what shall be undertaken in helping to develop the plans and in personally assisting in carrying out the agricultural improvement program.

Through the Farm Bureau of Today, then, we have the machinery for bringing the assistance of the county agent, the home demonstration agent, the county club leader, the extension specialist, the Agricultural College, the Experiment Station, the United States Department of Agriculture and the best judgment of leading farmers in the county to bear upon the most important problems in the community to be solved and how the work can best be done.

The county organization is not complicated; it is simple and easily understood. A county program of work is planned. This program is based upon the needs of the communities within the county as these needs are expressed by the community committees to the executive committee of the Farm Bureau. The community committee members are chosen because of their interest in and fitness for their particular line of work. These community committees are the foundation of the farm bureau structure. Unless they are efficient, well qualified for their particular duties and do their work effectively, the efficiency of the farm bureau

as a whole must suffer and fall just so much short of accomplishing all that is possible.

When the community committees of from three to seven people, depending upon the number of projects to be undertaken in the communities, are completed, the people interested in particular projects make up the county project committee. To illustrate: if ten communities in a county have chosen as one of their projects Farm Management Demonstrations, each community committeeman in charge of this project in these ten communities is a member of the county committee on Farm Management Demonstration. Naturally, from among this number the man most interested and best fitted for the work, will become the chairman of the county committees and ex-officio a member of the executive committee of the farm bureau.

Now let us see just how the farm bureau program is built from the bottom up. The following is a typical summary of a community committee meeting:—

A committee was recently organized in a dairy and potato community with some truck crops. The preliminary work of analyzing the community was done by the county agent and the home demonstration agent. The two most promising leaders were visited and arrangements made for a meeting to be attended by five men and two women.

At the meeting those attending were asked to sit around a table, the temporary chairman opening the meeting by saying it had been called to discuss the agricultural and home needs of the community and requesting the organizer to lead the discussion. The county agent suggested that a community map be made. The community center was located and then each person located their farm by number and drew in the road leading to the farm. As the map making progressed every one seemed to take a keen interest and made suggestions as to the location of certain farms, the bends in the roads as they wound around swamps or over hills, etc. The past year's work was discussed and the demonstrations, etc., located by symbols on the map. This naturally led into a discussion of the importance of each undertaking and finally to the advisability of continuing these projects and the taking up of additional work. It was finally decided that the following things should be undertaken:—

1. Bring in at least one carload of certain seed potatoes.
2. Get at least five farmers to keep milk records.
3. Secure a community power sprayer for controlling insects on potatoes, cabbage, turnips, orchards, etc.

4. Buy feed and seed cooperatively and assist in the organization of a county farmers' exchange.

5. Start a clothing salvage shop.

6. Try out the plan of having at least one hot dish for the children's lunch at each local school in the community.

7. Organize one or more boys' and girls' clubs, kind to be determined after details of the program have been worked out.

Each one present assumed the responsibility for one of the projects and each was to start immediately on the job. For instance, the potato committeeman was going to find out how many farmers wanted certified potato seed; the school lunch committeeman was to visit the schools, making arrangements with the teachers to start that work, etc. In this particular community the potato committeeman was elected chairman and the committeeman on school lunches was elected secretary, the plan being to submit the names of the chairman, secretary, and other committeemen to the executive committee for approval and appointment.

The plan of the farm bureau membership campaign was presented and a long discussion regarding its local application took place. Plans were made for the dividing up of the territory and each committeeman took a definite district. Thus each committeeman had a dual job. For instance, the committeeman on milk records planned to cover the entire community on the dairy project and also his school district on membership and publicity.

The minutes of the meeting were read and approved, thus binding each to carry out the work planned and assigned. Each committeeman was supplied with type-written copies of the minutes and also copies of the map. At the next and succeeding meetings the newly elected secretary understood that she was to keep the records of the meeting.

The agent's comment: "This particular community had never assisted to any marked degree with the farm bureau work. In fact, it was considered to be a very difficult community to handle because of the lack of local leadership. It would seem that this difficulty had been largely overcome through the holding of the meeting. In fact, the committeemen were so interested in carrying out the plans developed at the meeting that they were still in session discussing the membership campaign when the county agent started for home. It can be seen easily how the plans were developed logically, step by step; that first the people were asked to consider the needs of their community, then decide on things that should be done, choose responsible leaders

to direct the work, and, finally, organize a committee which can meet from time to time in order to coordinate all of the activities. The important piece of work that the committee had in hand which would require the combined efforts of all was the membership campaign. In addition, each one had something definite to do in promoting a piece of work in which they had the most interest."

A community committee will be organized in each important agricultural community and the programs of these communities will be brought together by county program of-work committees appointed by the executive committees, which will lead the discussion at the annual meetings in formulating the county programs of work. The county project leaders will be elected, who, together with the officers, will make up the executive committees of the farm bureaus. These county programs will form the basis for a State program.

The president appointed the following as a committee on resolutions:—

DR. J. L. HILLS,
H. K. BROOKS,
F. W. DRAPER.

Creamery Butter. 1919

Name	Sep.	Salt.	Col.	Fla.	Gr.	Col.	Salt.	Gen.	Ap. Score	
T. E. Donahue, Burlington,	DL	W	W	R	43	25	10	10	5	93
S. L. Harris, Proctor,		W	W	R	44	25	10	10	5	94
W. C. Donahue, Monkton,		W	W	R	42	25	10	10	5	92
J. B. Lucia, Jr., Middlebury,		W	Tha.		43	25	10	10	5	93
W. A. VanCour, E. Hardwick,		Col.	W	R	43	25	10	10	5	93
G. M. Hayward, Middlebury,		W	W	R	45	25	10	10	5	95
F. A. Rist, Wilmington,		DC	CH		45	25	10	10	5	95
F. R. Hayward, W. Fairlee,	DL	Wor.	W	R	45	25	10	10	5	95
John Bond, E. Montpelier,	DL	Wor.	W	R	45	24	9	10	5	93
W. C. Porter, Sharon,		Wor.	W	R	45	25	10	10	5	95
J. F. Donahue, Vergennes,		Wor.	W	R	45	25	10	10	5	95
C. B. Vincent, W. Hartford,	DL	Wor.	Ald.		46	25	10	10	5	96
C. M. Storey, N. Montpelier,		Wor.	W	R	43	25	10	10	5	93
E. C. Hillis, N. Montpelier,		Wor.	W	R	45	25	10	10	5	95
L. A. King, E. Corinth,		Wor.	W	R	45	25	10	10	5	95
Mt. Mansfield Cry., Stowe,					45	25	10	10	5	95
W. P. Stone, Strafford,		Wor.	Ch.		45	25	10	10	5	95
H. L. Lyster, Wells River,		Wor.	W	R	46	25	10	10	5	96
C. M. Lilley, Marshfield,		Wor.	W	R	46½	25	10	10	5	96½

Dairy Butter.

Frank Teer, W. Rutland, DL	Wor.	W	R	43	25	10	10	5	93
Mrs. R. Tyson, Brattleboro, DL	Wor.			43	23	10	9	5	90
Mrs. A. Delano, E. Shoreham,	Wor.	W	R	43	24	8	10	5	89
Mrs. Martin Bromley,									
Danby, Sh	Wor.	W	R	44	24	10	10	5	93
M. G. Eastman, Lyndonville, US	Wor.	W	R	44	25	10	10	5	94
The Point Farm,									
St. Albans,	Wor.	Ch.		45	25	10	10	5	95
D. A. Blaine, Barnet, DL	Wor.	W	R	43	25	10	10	5	93
C. J. N. Shackford,									
E. Ryegate, DL	Wor.	W	R	46	25	10	10	5	96
Chas. Gates & Sons,									
N. Hartland, US	Wor.	Ald.		46	25	9	10	5	95
H. M. Lee, Windsor,				45	25	10	10	5	95
R. T. Robinson, Ferrisburg, US	Wor.			45	25	10	10	5	95
Geo. Gebbie, Groton, DL	W		W	R 45½	25	10	10	5	95½
John B. Candon, Pittsford, DL	W		W	R 42	24	10	10	5	91
E. A. Darling, E. Burke, US	W		W	R 47	25	10	10	5	97
E. E. Perley, Richford, DL	W		W	R 43	25	10	10	5	93
S. H. Warren, N. Pomfret, DL	W		W	R 46	25	10	10	5	96
C. H. Leonard, N. Pomfret, US	W		W	R 46	25	10	10	5	96
A. E. Sherburne, N. Pomfret DL	W		W	R 45	25	10	10	5	95
W. H. Harrington,									
W. Hartford, DL	W		W	R 46	25	10	10	5	96
L. W. English, Woodstock,				45	25	10	10	5	95

Whole number entries 39, Highest score 97, Lowest score 89.

Everage score 94. Association Gold Medal and Dairy Sweepstakes Cup
A. A. Darling, E. Burke, score 97. Creamery Sweepstakes cup C. M. Lilley,
Marshfield, score 96½.

WEDNESDAY AFTERNOON SESSION.

PRESIDENT BICKFORD:—We are fortunate in having with us this evening the president of the New England Milk Producers' Association of Williston, Vermont, who will say a few words to us.

MR. FRANK W. CLARK:—Mr. Chairman, Ladies and Gentlemen:—

It has been my pleasure and my privilege in years past to attend the annual meeting of the Vermont Dairymen and I have often thought as we have gone from the meetings that I wished there was on foot at that time some organized action among the dairymen not only of Vermont but of New England and I am glad to say that that time has now come.

During December I attended the meeting of the National Milk Producers' Federation held in Chicago. That Federation is made up of all the milk producers' associations in the United States; there were delegates present from the Atlantic to the Pacific representing over 30 states and I want to assure you gentlemen that that meeting where those delegates brought in reports from all over the United States reporting the great progress that had been made in all the associations was very gratifying.

Here in New England we have been working to organize a milk producers' association and we feel that good results have been attained in the past two years, but the one great thing that we want to accomplish as regards the future is to do away with our state lines and make New England one great united family and work for the interest of this great dairy industry and we are not going to be satisfied to stop here. In order to have a great movement thru-out the United States we must do away not only with our New England boundary lines but we must also do away with all boundary lines thru-out the United States. Let us get together, not as dairymen of Vermont, not as dairymen of New England but as dairymen of America.

At this time they are experiencing a strike—we won't call it a strike—the farmers are just holding back the milk,—we will state it in that way, in the New York market. They are fighting there for their principles which are common to all the associations in the United States. The dairymen of New York are not trying to profiteer, they are merely asking for the cost of production and a little more, that they may have a decent living. When the dealers of New York want to take 1c from the consumer in retailing milk and then get that back on the producer they are going

to see united action on the part of the dairymen. I regret to say that some milk is being shipped from New England into the New York market. I hope after we have had this session here this week that some who are attending this meeting and know that this milk is going to New York will go home and try and use their influence against it.

As to the future of our work, we want to go on; it is inconceivable that the dairymen of America are going back to old methods whereby the dealers had the right explicitly to make the price of milk to the producer, that day has gone by. Let us stand for united action that this great work may go on.

As a closing sentiment I want to say to you dairymen the work that is going to be accomplished in the next 2 or 3 years will surpass, I believe, any work that we have accomplished in the past 2 years. Let us unitedly stand and work for this great industry,—*the dairy industry of America.*

PRESIDENT BICKFORD:—It is not often we have the president, secretary and manager of one association with us. In introducing the next speaker I will say that I believe he is the man that has taken the New England Milk Producers' Association as a failure and has helped to and really made it a success. I think he has done more to make this association a success than any other one man connected with it and I am sure all the members of the association will be glad to endorse my statement.

I have pleasure in introducing Mr. Richard Pattee of Boston who will speak on "Milk Production."

**HANDLING MILK, FROM THE PRODUCERS' STAND-
POINT.**

RICHARD PATTEE, SECRETARY AND GENERAL MANAGER,
NEW ENGLAND MILK PRODUCERS' ASSOCIATION.

Mr. Chairman, Ladies and Gentlemen:—

I take it, by the appearance and by the nature of this meeting, that you are the most progressive dairymen in all New England. Now why doesn't somebody clap his hands? (Applause). It would be very embarrassing indeed for me to undertake to assist you in the problem of production. You know more about it than I do. If you did not you would not be the progressive dairymen that you are.

I was told, when asked to come here, that I was to participate in a sort of a joint debate with my good friend Bradford, Manager of the Turner Centre Dairying Association of Maine, who was to speak on the problem of handling milk from the distributors' standpoint. Now, with the permission of the chairman of the meeting I am going to stick to the assignment as I received it and discuss, if you please, what seem to me pertinent problems for dairymen in the matter of marketing, from the producers' standpoint.

It would take a mighty good man to tell you anything about production. If you don't know all that is known about production, it is your fault, because here in New England you have in your six States, less territory than there is in many a single western state where dairying is the principal occupation of the people, and if you will exclude from your New England area the wild land and the mountain land and the other land that is impossible to dairying, you will have less dairy area than you will find in some counties in the western states, and in that area you have at least six state governments making appropriations for the support of various institutions to teach dairying. You have six state departments of agriculture, six state colleges, experiment stations and systems of extension service, six state dairymen's organizations and six of various other institutions, all of which, directly or indirectly, address themselves to the dairy problems of New England. There is no section of America so well equipped to study and solve the problems of production as is New England.

You have more of the machinery through which you may know the latest and best methods of production in New England, than exist in the same territory anywhere in the country, and every one of these agencies is not only competent but it is anxious and active and eager to get to you with the information at its command. If you have not acquired that information, it is not entirely because the people who have it were not anxious to give it to you,—it is almost because you refuse to receive it. It is a fact that these various agencies all over New England are waiting their chance to impart the information that they have, and it is your fault if you have not got it.

I am not going to discuss, this afternoon, any of those problems which are covered by the activities mentioned. Now I like, when I talk to a group of people, to know just about what kind of folks they are. Mention has been made of the fact that a struggle is going on relative to milk in the city of New York. Before I begin, with the chairman's permission, I am going to ask all the dairymen in this room who wish that their milk shall be put into the New York market to help beat down the price received by the producers regularly supplying that market, to say aye. (No ayes.)

Now I ask all the dairymen in this room who do *not* want their milk put into the New York market to defeat the price demanded by the dairymen regularly supplying that market, to say no.

"No."

Well, it is a unanimous vote, and I know who I am talking to.

With your permission may I suggest that no industry, whether it be dairying or anything else, can live that does not pay. I repeat that: No industry can live that does not pay. It is probably true that in days gone by a good many dairies have been sustained and continued, not on the receipts of dairy products but because there has been fed through your cattle, the money you received for timberlands and other cash crops. The mere fact that dairying has continued, to exist, is not evidence that it will continue to exist. It will not exist, I repeat, unless it pays. Now, in order that you may demand and receive in such ways as you may see fit, money for it to exist, you must first know what it costs. If you do not know what your goods cost you do not know what you must get for them in order to continue in the business. If you will agree with me, that you must *get* the cost in order to stay in the business, then the first thing for you to do is to *know* the cost. I want to

ask for my own benefit and for the assistance I can get from it in the work in which I am engaged, how many men in this room know what it costs them to make milk?

There is one fellow back there.

We have an audience of 400 people here and out of 400 dairymen who have come together in the city of Burlington to consider the business in which they are engaged, every one of them admitting that in order to sustain the business he must get a new dollar for the old one, and only one raises his hand to tell me how much money he must get in order to keep his business going. I want to impress it upon the minds of the dairymen of Vermont, that in order to perpetuate their business they must know what their product costs.

You have mighty good, efficient and willing agencies in the State of Vermont to give you the aid and support you need. In determining the cost of making milk, you can turn to any one of these agencies,—your Agricultural College, your Cow Test Associations, your County Farm Bureaus, all of them anxious and willing to aid you to determine what it costs you to make milk, all willing to furnish you with the blanks on which to keep records, blanks so simple that any persons who can set down a group of figures, can keep them; they will come to your place and do the adding and subtracting and multiplying and dividing for you. And all they ask of you is to take home a book or blank that costs you nothing and to put down the figures that they themselves will help you compute. As long as the dairymen of New England and of Vermont are not willing or do not for any reason furnish such organizations as ours', with figures whereby we can prove what ought to be paid in order to sustain this industry, you cannot righteously complain if you don't get those figures. My first point is, that no business can support itself that does not pay, and in order to know whether it pays or not, you have to know what it costs. No guess work, no what-you-think or heard or estimate, but what you *know*. When the government came into New England to establish the price of milk, and tried to get at the cost of production plus a reasonable profit, the first question was, what does it cost? And it was the hardest thing to prove what it cost. Out of over 15,000 dairies from which reliable information was sought, came less than 300 that could furnish reliable information. I got a letter the other day from a group of dairymen in New Hampshire, who said there were figures enough, that the colleges and other people had data that they had acquired in the past. It made me think of a

story I have told in many places about my step-father teaching my brother and myself to plant corn. My father put the hired man ahead to open up the hills, and then my brother who was a little older than I, with the phosphate, dropping an old fashioned pewter spoonful into each heel mark left by the hired man. I came along with the bucket of corn, and it was my job to put five kernels on top of that phosphate and father came behind and covered. They don't plant corn that way in Vermont now, do they? That would be an out-of-date way, and yet farmers are saying, "what is the use of my keeping any figures, there are figures enough". As though they never changed!

Assuming if you will, that the dairymen of New England have kept sufficient information to know what they must get for their product in order to sustain their industry, what are they going to do to get it? The product that they make must either sell or spoil. If they cannot sell it for enough to meet the cost there is no gain in the operation, there is no use in making the product. Having determined the cost the next step is to find a market, to get people to buy the stuff at more than its cost. In that connection there are two things that I wish to mention. First, you must create a demand. Somebody said, and it is a favorite quotation in Vermont, that the man who had the most beautiful thought, or the man who invented the best mouse trap, would find a pathway beaten to his door. That might have been good philosophy, but it is not always good business. The way to sell goods is to get out and sell them. A little while ago I noticed an advertisement in the Saturday Evening Post, that cost about \$12,000 for one issue in one paper, telling the people the merits of Kellogg's Toasted Corn Flakes, which I have been told, was a way of selling corn at the rate of about \$60.00 a bushel. And about the only real value there was in the corn so sold, was in the sugar and cream that was used on it, and yet by constant, attractive, judicious advertising, Kellogg's Toasted Corn Flakes and other similar products were sold at undreamed of profits not anywhere near represented by the value of the product, and yet we people who are in the dairy business are sitting still and saying nothing about the merits of our goods. When the Federal government, the State government, the private institutions, schools and others are appropriating public and private money to determine the value of what we have to sell, and are themselves, in spite of us almost, not because of us anyway, going out and telling the people that our stuff is worth more than we ask for it, where are we all the time?

Where would Kellogg's Toasted Corn Flakes be if they had the endorsement for their products that we have for ours? And yet we are kicking in New England because a certain part of the milk that we make for market, is at a certain season turned back to us unused. The first effort that I know of, on the part of the farmers themselves, in spending money to sell whole milk in the metropolitan market, was last May when the New England Milk Producers' Association, joining with certain individuals, raised a fund of about \$11,000 to help dispose of the extra milk, that was coming into the Boston market, through publicity. Eleven thousand dollars! Why, the Kellogg Toasted Corn Flakes people spent more than that for one advertisement one time in one paper. Now if we expect to dispose of our goods at a profit, we must create and encourage a demand for those goods that will absorb them at prices which will return to us the cost of production. Obviously that cannot be done by individuals. It must be done by the industry. Previous publicity designed to sell whole milk in its natural state in the markets of New England, has been limited to advertising done by concerns that had it to sell, and the general policy of such advertising was splendidly illustrated by an advertisement that appeared over the Hood & Company signature a year ago this month; an advertisement which I cut out of a Boston paper, pasted on a piece of cardboard, and hung up over my desk, and which the representative of the Hood Company, who was responsible for that advertising, every time he comes into that office, takes occasion to turn face to the wall. That advertisement says that in New York the previous year or some other year, a certain number of people died from the use of impure milk, but in all the years in which the Hood Co., has operated no case of disease has been traced to their milk. "Use Hood's Milk because it is safe." I have a calendar from the H. P. Hood & Sons Co. across the bottom of which runs this: "Use Hood's Milk, it is safe." What is the effect on the public mind of that kind of publicity? If I am any judge, it is something like this: that the consuming public will say to itself, milk is dangerous stuff. I will use just as little of it as I can, and what little I use I will buy of Hood. The Hood Company tells me that that class of advertising is the best business getter it has. No doubt it is good business, getting advertising for Hood, but Hood's increased sales represent some other concern's decreased sales, and we believe that that is destructive and not constructive advertising from the standpoint of the industry.

Last Spring for the first time in New England, under

the leadership of this Association and with \$2,700 of your money, we raised a fund for the first constructive advertising campaign that has ever been had in the Boston market to dispose of milk. We believe that the dairymen themselves must co-operate, and if possible direct a system of publicity, of salesmanship, of advertising, that will create a demand for our product, not necessarily at its value, but at least at its cost, in order that you may sustain the industry.

Second, we believe, and I know that you do, that you must not only know what your product costs, and have also back of that a demand for it at that cost but you must have a system of distribution that will bring back to you the greatest possible amount of what the consumer pays. It is to your interests to see that your product gets to the consumer at the lowest figure consistent with the maintenance of the industry.

Two or three years ago this winter, I attended the sessions of the Interstate Commerce Commission in Boston, which was studying the transportation system of New England. One night, after a long and harassing day on the witness stand, I heard the President of one of the leading corporations that distributes milk in the city of Boston and other New England cities, testify under oath, that he was a merchant in milk, and as a good merchant, it was his business to buy cheap and sell dear. As a merchant in milk, it was his business, his purpose, his policy, to buy cheap and sell dear. Let me say to you, that I believe the success and maintenance of the industry depends largely upon a reversal of that policy. We must sell cheap and buy dear. In other words, we must get as much as we reasonably can, at least enough to maintain the industry but at the lowest possible cost to the consumer. It is to the interests of the producers themselves that distribution be made at the lowest possible cost.

I think it is fair to assume that in the past milk has not returned to the farmers who produced it, a profit in the operation. It is still fairer, if anything can be fairer than fairness, to assume that the farmers of New England are entitled, if they maintain the business on an efficient basis, to a larger income from their sales. In other words, they must have more money than they have had for their milk. If you are going after more money, where are you going for it? I used to rent a place in Ashland, N. H. of a Grand Army veteran who was quite a philosopher and quite a character. I said to him one day, "Colonel, given a young man, 21 years old, fair education, good health, or-

dinary ability, who wants to make money, where will he go?" The old man tipped his face around and said "Want to make money?" and I said, "Yes,". "Hell" he says (you will excuse the language, but it was his own) "Hell, go where money is". That is not bad advice. If you want to make money, go where money is. Let us examine, if you please, where the money is in the milk business. Where can you get more money? In the first place you can get it by raising the price to the consumer,—an undesirable thing to do and a thing that should be done only as a last resort. To raise the price to the consumer jeopardizes and imperils the extension of your business, and it must be preceded, if it is done at all, by a well conducted campaign of publicity to teach the consumer that such an advance is justified and that the goods are cheap at the advanced price. (Applause.) Generally speaking, an advance to the consumer is in my judgement, not the desirable way to get money. We have studied the business and we find that in between us and the consumer there stands a class of people whose policy has been, is now, and ever shall be, world without end, amen, to buy cheap and sell dear. We find that that class of people are the ones that have been making money in the milk business.

I wish Mr. Bradford was here, because he is one of the big figures in these affairs in New England and one of the ablest men in the milk, cream and butter business that we have in the country. Let us see what this one man has done. Over in the state of Maine, about 34 years ago, there appeared what was known as the Turner Centre Creamery Association, a little country creamery way back from the railroad with one man firing the boiler and running the machinery, making the butter and taking in the milk, and selling the product, working for \$1.25 a day, and when he had to have help, hiring a young fellow in the neighborhood at ten cents an hour, and that man was Mr. Bradford. The Turner Centre Association is one of the largest purchasers of dairy products in New England today; does a business of upward of \$4,000,000 a year. For a long period that little country creamery was run as a co-operative association. Afterwards it became incorporated with a capital stock of about \$3,000.00 and it operated on that capital stock until the assessed valuation of its taxable property was far in excess of that amount. From time to time since then the investment in the Turner Centre Association, the actual capital put into the business by stockholders, has been increased until \$350,000.00 actual money was put in by the owners of the stock. There is, in addition, about

\$40,000.00 or \$60,000.00 of preferred stock, which as you know, is simply a polite term for a debt. It is a stock that can be retired at any time and is guaranteed to draw a certain interest. The reasonable valuation of that concern, aside from good will, is today approximately one million dollars. The difference between what has been invested in the Turner Centre Association by the stockholders and the value of that plant today is practically what was taken from the milk checks of the producers who turned their product over to that company and which was invested by the Company in its own property in the extension of its own business. The Turner Centre Association has operated all these years on a profit-sharing plan. The farmers of Maine today turn over to the Turner Centre Association, without contract on their part, to return to them any sum of money, their dairy products, and the Association takes them to market, sells them, and charges the producers what it sees fit, keeps out of the receipts enough to pay themselves five per cent interest on the investment, enough to insure their own property, a profit sharing dividend to their employees enough to make repairs on the plant and enough as a depreciation fund to replace anything that might go wrong, and then in addition to that they deducted a certain sum each year to build up the business, to build up *their* business, to build up a business that *they* own, to build up a business that Turner Centre and not the farmers own. Yet under that system, largely due to what I believe to be an honest management, efficient management, a clean cut, businesslike administration, that concern returned to its farmers a better price for what it handled than any other concern in New England, so far as my knowledge goes. But out of the price received for the dairy products it handled, it took a definite quantity of money and put it into its own pocket in addition to its interest, its expenses and every other,—what you might call legitimate charge, every other charge that represented a reasonable cost.

Take another concern, H. P. Hood & Sons. Almost, within my life time, H. P. Hood & Sons was a family business in the state of New Hampshire in the town of Derry. They took a few cans of their own, and some of their neighbors', milk to Boston and handled it out of the car doors. That business prospered to such an extent that the Hood family determined it should be an incorporated business, and it was incorporated in the State of New Hampshire for \$40,000.00. It ran along on that for a while until the men who owned the stock of H. P. Hood &

Sons, went over in the state of Maine, where the laws permitted it, and formed a Maine corporation; the same men formed another corporation known as the H. P. Hood & Sons, and issued \$1,100,000.00 worth of stock in the new corporation to buy up the \$40,000.00 corporation in New Hampshire. The records will show that within six months the officials of that corporation under oath, have testified that the physical assets of that concern were worth approximately \$2,000,000.00 and they asked in the past year that the authorities, the United States of America, put a price on their goods to enable them to earn interest on that investment, drawn from handling of milk in a few years. The money has been in handling. You may say that per quart, distributed over the volume of milk handled, it may be very small, and that is true, but there is a source of income in the handling of milk that at least is worthy of study as one of the places where money is.

Now then, what is the present situation from what we might call an economic standpoint? Under the present system of distributing your products there is in the state of Vermont, one section—Randolph—where at the same railroad station there is a plant erected by H. P. Hood & Sons to conduct its business; another plant operated by G. Brigham Co. to conduct its business and the farmers have erected still another plant at that station to conduct a part of their business. Three plants at one station. Is that economy? There are certain sections where the business operated by your chairman is located, where the Lyndonville, the Plymouth Creamery, H. P. Hood & Sons, and several other buyers are cutting circles around each other to get at the dairy. That is a bad, expensive and wasteful method of buying, waste in handling, an uneconomic situation. If Mr. Bradford were here today, I would call on him to verify a statement which he has given me, that the Turner Centre Association alone in the six months from January 1st till June 30th, inclusive, poured into the Kennebec, if that is the name of the river at Auburn, 387 1-3 tons of milk sugar in six months, which if it had been reclaimed would have been worth approximately at that time 20 cents a pound. Last summer in the city of St. Albans, H. P. Hood & Sons were directed to put men on the river to clear it of milk, because the dumping of sour milk in the stream had become dangerous to public health. Right around this country last summer, when we were going through it, at your expense and mine, raised by public tax or Liberty bonds, or some way, we were at every turn confronted by signs bearing these words: "Food Will

Win the War. Don't Waste It." And right here in New England the present marketing system under which our products are handled, throws into Lake Champlain and the Atlantic Ocean, tons and tons of food that is of value, and wastes it. I say to you dairymen of New England, when your product is handled in such a wasteful and extravagant manner, and yet handled by a group of people whose policy has been to buy cheap and sell dear, and who in the operation, in the lifetime of you and me, have cleaned up millions in the process, there is something wrong with our marketing system and we must be pretty careful before we ask the consumer to pay more for our products until we have an efficient means of distribution.

Why is it that we are coming to you with these ideas and these facts? Simply because now, for the first time at the producers' end of the line, there has been created an organization to study into these methods for our own protection. The consumers are not organized, and they do not know of these practices. If they did I apprehend they would protest. It is not my policy to call attention to an abuse without suggesting an improvement. I don't believe in tearing down a policy or operation unless it is for the purpose of putting in its place, something that is better. Yesterday, in conference with the president of the H. P. Hood & Sons Co. he made the statement that it was to be regretted that there was any attempt or policy of creating between the producers and consumer any new agency or function; that we should seek to simplify the process, to concentrate it as much as possible. He said specifically that it was a sad mistake when the operation of transporting milk was taken away from the milk companies and given to the railroads. It introduced a new party between the producer and the consumer. And I couldn't help in following his thought, seeing that the logical conclusion of his statement would be, that it would be of advantage to the business to eliminate every intervening agency between the consumer and the producer, including himself. In other words, I believe that it would be, and is the development of the marketing system of New England, for the farmers to own the facilities whereby they may place their products in the market. (Applause.)

You started out here with a unanimous vote that you did not want your milk to go into the New York Market to beat the New York dairymen. The milk of New England is going into the New York market to beat the New York dairymen. The concern in Vermont of which the chairman of this meeting is the manager, is sending milk to New

York today. I don't say and I don't believe it is his fault, but the Lyndonville Creamery is sending milk to New York, your milk, to beat your brother dairymen in their fight for a living price. Why? Because it is to the advantage of the concern that handles your milk to buy cheap and sell dear, and they know that if they can break the farmers' organization in New York, they can break the farmers organization in New England and in all America. (Applause.) Don't think that I am making a personal attack on the chairman of your meeting because I don't believe that a man with the conviction and interest Mr. Bickford has, would permit that to be done if he could control it. I think he is a different man from that or you never would have elected him president of the Dairymen's Association of Vermont. But these are the facts. Do you want to control the agencies that handle your milk? It seems to me obvious that you do.

One thought in closing. We have been accustomed to regarding the acquisition and operation of these large business enterprises as impossible to the farmer. In the state of Vermont, under the leadership of your Department of Agriculture, or under the more intimate leadership of the Bureau of Markets in the Department of Agriculture, you have been teaching your farmers to own the facilities for handling their milk. We believe, and I think you believe, that such an ownership should extend not only in the state of Vermont, but in all New England, in all the territory that competes in the market with your milk. It is a beginning, but it is necessary to extend farmer ownership of the facilities for marketing milk beyond the territory of Vermont. (Applause.)

You say you can organize a local community creamery and conduct it as you will, but when you come up against the proposition of extending farmer ownership of the marketing facilities of all New England you shrink back and seem to assume that such is a job that can only be done by men of gigantic intellect, masters of finance, men of great, big, wide business vision, and all that sort of thing. Let me tell you that if you will sit down across a table, as I have done in the last three or four years, from the great milk barons of New England, you will find that they are mighty common clay. (Applause.) I would be ashamed to live in Vermont if I could not find in that state, men on the farms who are the equals in any respect you will name towards successfully operating such a business, of any man who is in the milk business in the city of Boston. The only trouble with us is we have not confidence in ourselves,

we don't know what we are worth. We have let the other fellow tell us too much. I have been surprised at the success that men of very limited business ability have made in the business of handling dairy products. I will be more surprised, if when the time comes for the farmers of Vermont and all New England to assume control of the distribution of their goods, they don't find among themselves plenty of men with bigness of vision, with business ability sufficient to make dairying in New England the paying proposition that it must be if it exists. I thank you. (Applause.)

Clay Baldwin, President of the Chittenden County League, spoke briefly and among other things he said:

Referring to what the last speaker said as to the cost of production of milk, I know there are men in this hall, plenty of them, who didn't want to stand up but who know what the cost of milk production is. He has spoken about the milk from Vermont that is going down the line to defeat the ends of the New York Dairymen's League.

I want to say that the object of the Dairymen's League is to see to it that Vermont milk does not go down into New York and we appeal to you as brother farmers—not as dairymen but as farmers—and a friend of the weaker brother to stop this action.

WEDNESDAY EVENING SESSION.

The program for the evening was carried out at the Van Ness House following a banquet, consisting of clams served in various styles, as a compliment of the Worcester Salt Company. The guests numbered around 300 and each was loud in expression of appreciation of the thoughtfulness of Mr. McGaffey, who had the matter in charge.

Secretary Martin presided at the speaking which came at the close of the banquet.

Apropos to the situation the following limerick met with hearty response:

There was an old man in a hearse
Who murmured, "It might have been worse,
Of course, the expense is simply immense
But it doesn't come out of my purse."

Following that Mr. Martin said, "We are here as the guests of one who has seen the Vermont Dairymen's Association grow from an infant to the largest association of

its kind in the United States. He has a space down in the Armory that he never reserves; there is the mark on the floor and nobody preempts it; he is always present at the opening of the annual meetings of the Dairymen's Association and is one of the last to leave. It would be strange indeed if during all these years he had not accumulated a large number of friends. You know the great trouble of having friends is the "upkeep"; but our host this evening does not find that a hardship. He insists that he has not developed the art of after-dinner speaking; but it seems to me everything would be wrong if we did not receive a few words of welcome from our good friend and host Mr. McGaffey of the Worcester Salt Company.

MR. MCGAFFEY: Mr. Chairman, Ladies and Gentlemen:—Mr. Martin promised me faithfully he would not call on me to say a word. He knows I can't make a speech. I think this is the twentieth meeting of the Association that I have attended and every one of them have been bright spots in my life. I certainly appreciated more than I can tell you now the friends and acquaintances I have made during these twenty years and if tonight you have enjoyed this little supper half as much as I have enjoyed being with you I am well pleased. I thank you.

MR. MARTIN: We had expected an eminent speaker, a personal friend of Mr. McGaffey, who has been connected with the food administration at Washington, to be with us tonight. His duties are so closely connected with that office that a telegram announces to us he had been ordered to return to Washington today to attend a conference of the members of the food administration who have recently returned from Europe. For that reason he is not with us: but I am not going to express a large number of disappointments in introducing the following speakers, because we are not disappointed. We have such an array of talent that it is doubtful if we will have time to call on all of it but I am going to call on three or four who have been identified with the dairy interests and with the association. We have one man with us who I believe was a charter member of the ancient and more or less honorable order of the "Turkey Buzzards" (continued laughter). He tells me he has been coming to the association meetings, I think this is the 34th year, and he has probably contributed more to the uplift of the Association than any other one member. I think it is fitting that we should have a few words from our former Secretary and President Fred L. Davis of Hartford.

MR. DAVIS: Mr. Chairman, Ladies and Gentlemen:—

I hardly know whether to take this as a compliment from our secretary or whether he is getting even on one of his grudges against me. You have known and have seen more or less of me for thirty-three years and are all well aware I am not much of a public speaker. Thirty-three years ago I attended my first meeting of the Dairymen's Association held at Montpelier, taking a sample of Jersey butter. I think there were about seventy samples exhibited. The two highest scoring samples were the Green Mountain Stock Farm of Randolph and mine. A gentleman from Boston scored the butter—he has since passed to the Great Beyond. He did not decide the first day who should receive the sweepstakes. I was young and of course anxious to make a good showing. The butter scorer was invited that evening down to the Green Mountain Stock Farm, with several others, for an outing and supper; the next morning the scores were read and the Green Mountain Stock Farm received the sweepstakes and Davis second. I have always been sorry I was not able to put up a good supper the night before.

I am proud that I began attending the Dairymen's meetings thirty-three years ago and have special pride in saying that I have not missed an annual meeting since. I think there is no other member of this Association who holds that record; although there may be men who have attended meetings more years probably than I. I have seen a good many changes. Many of these have been brought about by our commission men like Mr. McGaffey, Mr. Thurlow and the separator concerns—The DeLaval and the United States—and other men connected with dairy products. I think what created the most enthusiasm, increased our exhibits and our attendance was the competition between the Worcester and Diamond Crystal Salt Companies. Those were times when there was "something doing." They offered gold watches, fountain pens and various articles as prize premiums and one year we had 225 samples of butter. I assure you it took several gold watches and fountain pens to pay for the scores that year but it paid, for it brought the people here and they found out what the Vermont Dairymen's Association was. They did not know before; they became interested; they became members and they went home and told their neighbors; they came the next year and their neighbors came and they have been coming ever since bringing new members with them, until today the Vermont Dairymen's Association is

the largest association in the United States with the exception of Wisconsin, I am advised. I firmly believe this has been brought about in a large measure by the commission men, who have come here yearly. We are glad they have come with us. I think it was about twenty years ago I became acquainted with Mr. McGaffey and since that time, to my knowledge, he has always been doing something for our Association at the right time and the right place—usually in the city of Burlington, which has become or ought to become the annual gathering place for this Association, as there is no other place in the state equal to providing us with space for machinery exhibit and hotel accommodations. I thank you for the attention you have given my attempt at speaking.

Mr. J. F. Kelley, who addressed the convention Tuesday evening was called upon and responded with a brief talk along the lines of dairying in general and food production and the necessity for an increase in food production in particular as pertains to the dairy products and the marketing of same.

Miss Bernice Richardson of Montpelier gave a reading much to the delight of her listeners.

M. R. Tolstrup, in charge of Marketing for the State, was introduced by the secretary and he enlivened the evening by telling several good stories. When he finished his hearers had no doubt that he would rank high in the list of Vermont's post-prandial speakers.

SECRETARY MARTIN: Our last speaker on the program this evening has for his subject "Schools and the Maple Industry." I take great pleasure in introducing Vermont's Commissioner of Education, Doctor Milo B. Hillegas, of Montpelier.

DOCTOR HILLEGAS: Mr. Chairman, Ladies and Gentlemen:—

I rise with some degree of embarrassment because I recognize here tonight a considerable number of people who were present on a similar occasion 2 years ago when I was introduced by Congressman Frank L. Greene. I am sure those who were present at that time will remember the words with which I was introduced. Mr. Greene said that at one time a man was visiting an insane asylum and as he went about the Institution with the superintendent, the superintendent said: "We are about to have an assembly of the inmates and I would like to have you speak to them". The visitor replied "I don't know how to speak to people of that sort". The superintendent said "well, it doesn't

make much difference what you say, I will call them together and it will give them an opportunity to get their minds off their troubles." Finally the man consented to speak to the inmates. After they were gathered together and he had spoken to them for a couple of minutes a woman cried out "My God, have we got to listen to this too?" The superintendent who was sitting near the speaker said: "never mind, go right on: she only has lucid intervals once in 3 or 4 years".

G. Stanley Hall in one of his books tells of the number of operations he was able to perform when a boy. Mere mention of these covers some several pages of a comparatively large book. He includes such activities as being able to milk, to care for cattle, harness, drive and care for horses and teams, to mow with scythe and with a cradle and to do the many other things necessary on the farm. The older men here will recall many things which were common among the boys and girls of their age.

As a matter of fact, in the time of which Doctor Hall was speaking the home was nearly self sufficient. There were very few things that were required in the home that were not produced on the farm or at least in the immediate neighborhood. I can remember as a boy in my grandfather's home that a tin can was virtually unknown. There was no mechanical device for opening such a thing in the home and when it was necessary to open a tin can, although my grandfather was not a man who used profanity, I am absolutely certain that grandmother was always relieved when the work had been accomplished without grandfather saying anything or without cutting his fingers with the old butcher knife used for that purpose. How conditions have changed! I am reminded as I pass through the country of the tremendous change that has taken place in our living. There is practically not a farm house in this state that cannot boast of its pile of empty tin cans somewhere either along the road side or in some other less conspicuous place.

To morrow morning when you take your breakfast I expect you will have for fruit something that was produced either in Florida or in California or perhaps in the India Islands. The bread that you eat will probably be made of grain that was grown in the middle west or the great northwest and so with nearly every article of food.

No longer is the home self sufficient. We depend upon others and what is true in regard to the matter of food and clothing in the home is also true of the social condition in the home.

Our grandmothers never would have been content to go out on an afternoon with a few calling cards to leave at the different houses and be thankful the ladies were out so they could leave their cards rather than make a call. When our grandmothers and grandfathers went to make a call they went for 2 or 3 days and if they tarried for less than that time there was danger of giving offence to the persons on whom they called. Look at the magnificent old houses that we have around this state! They are the despair of the present day housekeepers! Yet our grandfathers and grandmothers needed exactly that size house in order to take care of the social affairs connected with their lives, for the activities that went on in the community, the singing school, the spelling bee, and the variety of interesting things taking place in that community was held in the home, so that there was little or no need at that time for newspapers, the telegraph, telephones, automobiles and the different affairs we have now.

These have all tended to bring more into the home but also to make that home more dependent upon the other parts of the country. Our homes today are not self sufficient. We depend on other people, other communities, even other nations. It might well happen in our grandfathers' day that in the school itself very little attention should be given to these ordinary affairs that so occupied the attention of the boys and girls outside of school. I think our grandfathers would have resented having any teacher in the public school attempt to teach their children how to use the grass scythe or how to use an axe. Do you think our farmers' boys today know how to use the axe? Some months ago I went by a group of farmers' boys who were in school, and who were trying to split wood. Do you know what they did? They struck the axe straight down into that chunk every time then with their foot on the log tried to pry the axe out of it. Do you know that we have boys in the State of Vermont living on farms who cannot hitch a team of horses and do it properly? It is absolutely true that we have boys living on farms that are selling milk and yet the boys themselves cannot milk a cow properly. All these things that are being taught in the public schools would have appealed to our grandfathers as the utmost folly. The grandfathers were teaching their boys and the grandmothers were teaching the girls in the home. The past couple of years have brought back to us many of these useful pursuits. The almost lost art of canning and pre-boys and girls are having the same advantages that our serving has been brought into the homes. At present our

boys and girls are having the same advantages that our grandfathers and grandmothers had. Some attention must be given to these things in the school because such instruction is not received outside the school. I think I can say without fear of successful contradiction that the type of education our grandfathers received was a much more practical type than we are giving today because we have separated absolutely in most cases the work of the hands which our fathers and grandfathers got outside of school from the work in the school and trying to teach the boys and girls in the school what they should learn by actual doing with the hands outside of school.

My first proposition to present to you this evening is whatever is of importance in the community is a matter that should be considered in the public schools of your community. I want to guard myself against misunderstanding. I don't want the school to reform the home. I don't know how you feel about it, but I don't want to be reformed. Do you? If there is anything to give it is the home that is to give to the school. I wish I could impress that upon every home in this state. It is not the school that is to give to the home but the home should give to the school. I want to clinch that point with an actual case here in the state.

Several years ago in one particular community in Vermont they were giving an agricultural course in the high school and very properly the teacher of that agricultural class decided that he would like to have a practical demonstration upon the judging of horses. He took his class down to the stable of a salesman and the salesman brought out a horse. The class looked the horse over. Everything went along all right until they got to the horse's mouth to find out his age. The instructor looked into the horse's mouth and called the attention of the boys to certain features there and said "here is a horse that is 7 years old". The man who was conducting that stable said not a word but soon after the class had left he took occasion to go up to the school and say to the principal: "For goodness sake! don't turn that fellow loose, he has just been down to my stable and pronounced a horse that is 17 years old 7 years old". Never again could that young man get a hearing in that community. Last year at the Vail School we arranged for the judging of horses. We did not put on one of our instructors to teach those boys how to judge a horse, we took a man who knew a horse from his heels to his ears and had him teach those boys how to judge a horse and in 3 days they knew more about horses than they would have

known in 3 months of instruction by a person who had not had practical knowledge. I repeat, the home has more to give to the school than the school has to give to the home. There needs to be very close intimacy between the home and the school.

The next suggestion I offer is that you people who represent the progressive element in the sugar making industry of Vermont as well as farming and dairying should make it one of your first duties to see that the teacher of your school is invited to your place and that you talk that industry over with that teacher. If you will do that and bring to the mind of the instructor of these boys and girls the significance of all things agricultural the next generation 15 or 18 years from now, when they come here to these gatherings, will be facing an entirely different proposition from what you are facing.

I want to call your attention to the matter of the teachers in our rural schools. This state as well as this country is standing in the most serious condition in reference to teachers that we have ever faced. This morning I had occasion to look over some facts in reference to teachers and I found that in October there were 22,500 rural schools in these United States without teachers, more than 5,000 positions in the cities and villages that were without teachers and we had actually to put into the rural schools of this country 120,000 young women who had never had a day of experience. Fortunately Vermont has not been as hard hit as some of the other states. Michigan reported one rural school in each ten without a teacher this fall; Ohio reported a shortage of 2,200 rural school teachers. We have not had a very marked shortage but I am free to say that if 10 more schools should become vacant within the next 10 days that they would have to remain without a teacher because we are at the limit of our teachers; and that is not because we have raised standards, mind you. You say money has called these teachers away from the school. Not a bit of it! Some, possibly, were attracted by larger salaries but the thing that has driven our teachers away is the fact that they have felt that they were not rendering a really patriotic service. Just the moment you people—I am speaking directly to the more progressive farmers of this state—just the moment you get acquainted with that woman teacher, invite her to your home and talk with her about the things that concern you as a member of the Maple Sugar Makers' Association, you make her feel she is rendering a real service in your community, and just that moment we shall cease to be troubled by our teachers leaving. It is

because these girls are discouraged that they are leaving our schools in such numbers. Recently I went into a school room where there were assembled 25 boys and girls and there saw some of the best work done by that teacher I have seen in the state. I commented on the splendid work she was doing. I had seen a great deal of teaching in reading and yet that girl had the knack of teaching those children to read that was amazing to me. What was the situation? She felt that her life there was absolutely useless. There had not been one solitary soul in that community who had said a word to her about her work. How much it would have meant to that young girl if some family in that community or group of families had invited her into the home and talked over with her the situation in regard to the school. I don't see why we have been so short-sighted as to let these teachers go along and feel the way they are feeling. Consequently, I say that, first of all, you should get the teacher in the rural school into your home and discuss subjects with her so that she may know what you are thinking about these big problems. Talk over the maple sugar industry with her and the marketing of the product or some of the other problems that should be taught in the school. The moment she gets interested in those thoughts they are going to work out in the school.

In the next place let me suggest that in your schools, you see to it that the maple sugar industry receives some consideration in the course of study. Why should we teach our children how to grow, gather and can pineapples in the Hawaiian Islands and leave untaught the whole matter of the maple sugar industry in Vermont? Why should we teach the manner of growing and the method of transportation of fruits and grains in other states and leave untaught the very things on which the life interests of these boys and girls of ours depend? I suggest to you that you see to it that in the schools in your community the things in which you are interested find their way into the course of study and that our boys and girls learn about these.

As a third suggestion, I believe it is entirely possible in each one of these little rural schools as well as in the larger schools to have an exhibit of products. Let these exhibitions of products take the place of the old spelling-bees. There ought not to be a month in the year when something that is of interest to the farmers and people in a given community should not be shown in the rural school. I want to leave as the main suggestion of this occasion that whatever is of interest to you in the community is of interest to the public school and to suggest that you take

unusual precaution and go out of your way to invite the teachers into your home and talk with them about the things that interest you as progressive farmers in order that these things may be taught our boys and girls in the school. Last of all, have an exhibition in your school of the products of your immediate community and I will make you this promise that if any of you are interested in having these exhibitions in your school and will write to me I will urge the Commissioner of Agriculture to send to you some one who can help you in this work, to make it the event in your community, so that all the farmers will be brought together in the schools and then you will enjoy such times as you used to have and such as your fathers and mothers and grandfathers and grandmothers always had in the rural communities.

The guests, rising in expression of thanks to the Worcester Salt Company for its pleasant entertainment, joined in singing as a goodnight "Auld Lang Syne."

THURSDAY FORENOON SESSION.

**SUMMARY OF THE TWELVE MONTHLY EDUCATIONAL
BUTTER SCORINGS FOR THE YEAR 1918.**

H. B. ELLENBERGER.

During the year 1918 the Extension Department of the State Agricultural College and the State Department of Agriculture cooperated in conducting a series of twelve monthly educational butter scorings. Four hundred samples of butter were entered and scored. Sixty-two creameries have sent samples during the year. The average scores of all samples were as follows:

	Creamery Samples	Farm Dairy Samples
Jan.,	90.4	89.0
Feb.,	91.1	89.0
Mar.,	91.3	89.6
Apr.,	91.8	89.8
May,	92.0	90.9
June,	91.7	90.6
July,	92.6	91.5
Aug.,	92.6	91.8
Sept.,	92.0	91.2
Oct.,	92.5	91.3
Nov.,	92.4	91.7
Dec.,	92.2	91.5

This shows a very noticeable improvement in quality. The creamery samples increased from 90.4 in January to 92.2 in December a net gain of 1.8 in score while the farm dairy samples scored 89.0 at the beginning and 91.5 in December a net gain of 2.5. The same improvement is shown when we average all of the first samples sent by each contestant, all the second samples sent by each contestant, etc., regardless of the time of year. For instance during every month there have been one or more creameries send-

ing samples for the first time. The average score received by those sending samples for:—

The first time,	90.8
The second time,	91.4
The third time,	91.4
The fourth time,	92.1
The fifth time,	91.9
The sixth time,	92.5
The seventh time,	92.8
The eighth time,	92.7
The ninth time,	92.5
The tenth time,	92.6
The eleventh time,	92.5
The twelfth time,	92.4

This shows a net increase in score of 1.6.

The difference in market price of butter scoring 91 and 92.5 is usually from 1—2 cents per pound. If the quality of all Vermont creamery butter could be improved to this extent it would mean increased returns of from \$100,000 to \$200,000 annually. This is worth working for and if the creamery patrons and the buttermakers will each do their part more than this may be realized.

The highest scores made each month together with the names of the creameries sending the samples were as follows:—

Month	Creamery	Buttermaker	Score
Jan.	No. Montpelier Coop. Cry. Assn.	C. M. Story	93.0
	Deerfield Valley Cry. Assn.	F. A. Rist	93.0
Feb.	Farmers' Coop. Cry. Co.	L. A. King	95.0
Mar.	No. Montpelier Coop. Cry. Assn.	C. M. Story	94.5
Apr.	Meriden Cry. Assn.	W. L. Olsen	94.5
May	Washington Cry. Assn.	O. E. King	94.5
June	Vershire Coop. Cry. Assn.	L. S. Flint	94.0
	Maple Leaf Creamery	Euclid Trahan	94.0
July	Lamoille Valley Coop. Cry. Assn.	W. A. Vancour	95.0
Aug.	No. Montpelier Coop. Cry. Assn.	C. M. Story	95.0
	Wardsboro Coop. Cry. Co.	Hanna Halonen	95.0
Sept.	Lyndonville Cry. Assn.	A. H. Jewett	94.5
	Maple Leaf Cry.	Euclid Trahan	94.5
Oct.	Lamoille Valley Coop. Cry. Assn.	W. A. Vancour	95.0
Nov.	Vershire Coop. Cry. Assn.	L. S. Flint	94.5
	Lamoille Valley Coop. Cry. Assn.	W. A. Vancour	94.5
Dec.	No. Montpelier Coop. Cry. Assn.	E. C. Hillis	94.5

The monthly leaders in the farm dairy class were:

Jan.	C. E. Taft
Feb.	T. W. Kingsbury
Mar.	C. E. Taft
Apr.	L. J. Stockwell & M. G. Eastman
May	T. W. Kingsbury
June	M. G. Eastman
July	T. W. Kingsbury
Aug.	L. J. Stockwell
Sept.	L. A. Gillan
Oct.	L. J. Stockwell, (Scott Farm)
Nov.	L. J. Stockwell, (Scott Farm)
Dec.	L. J. Stockwell (Scott Farm)

Certificates are to be awarded to each creamery and buttermaker having sent at least nine samples none of which scored below 90. The following is a list of the creameries and buttermakers receiving this award together with the average score received on nine entries of butter.

Creamery Class.

Creamery	Buttermaker	Address	Avg. Score
Lamoille Valley Coop. Cry. Assn.	W. A. Vancour	E. Hardwick	93.9
Vershire Coop. Cry. Assn.	L. S. Flint	Vershire	93.6
Deerfield Valley Cry. Assn.	F. A. Rist	Wilmington	93.4
N. Montpelier Coop. Cry. Assn.	C. M. Story	N. Montpelier	93.3
Meriden Cry. Assn.	W. L. Olsen	Meriden, Minn.	93.2
Washington Cry. Assn.	O. E. King	Washington	93.1
N. Montpelier Coop. Cry. Assn.	E. C. Hillis	N. Montpelier	93.1
Marshfield Coop. Cry. Assn.	C. M. Lilley	Marshfield	93.0
Wardsboro Coop. Cry. Assn.	Miss H. Halonen	Wardsboro	92.9
Farmers Coop. Cry. Co.	L. A. King	E. Corinth	92.8
Maple Leaf Cry.	Euclid Trahan	Swanton	92.8
Noysville Cry.	R. H. Lawson	Walden	92.8
Elgins Springs Cry. Co.	Eugene Beaudet	Vergennes	92.4
Danville Cry. Assn.	F. S. Morse	Danville	92.2
Lake Dunmore Cry. Co.	R. H. Fletcher	Salisbury	92.1
Orange Co. Cry. Co.	L. R. Brown	Chelsea	92.0
Maple Hills Cry.	Z. A. Johnson	E. Berkshire	91.9
Mt. Mansfield Coop. Cry. Assn.	R. H. Metcalf	Stowe	91.5
E. Montpelier Coop. Cry. Co.	John Bond	E. Montpelier	91.3

Farm Dairy Class.

Farm	Maker	Address	Avg. Score
Scott Farm	L. J. Stockwell	Brattleboro	92.1
	T. W. Kingsbury	Cavendish	91.6
Elmmount Farm	M. G. Eastman	Lyndonville	91.4

ENTRY BLANK FOR THE EDUCATIONAL BUTTER SCORING.

Maker Address.....

Creamery or Farm.....Address.....

The sample of butter for scoring should be packed in a five pound box or other suitable container, thoroly chilled and then placed in a larger box and the surrounding space packed with paper. Ship to Prof. H. B. Ellenberger, Morrill Hall, Burlington, Vt. by parcel post or express so as to reach Burlington, not later than the day before the scoring. See that your name and address are on the tag, not on the package of butter. Mail this blank, being sure to fill in name and address, and sign the statement on the last page. Entries without this signed statement will be scored but not entered for a prize or certificate. Answer the following questions as fully as possible leaving blanks after those you cannot answer.

1. Date churned.....Kind and size of churn.....
2. Acidity of cream.....Age.....Quality.....
3. Was cream graded.....How.....
4. Was cream Pasteurized.....Temperature.....Time.....
5. Was starter added.....Kind.....Amount.....
6. Ripening temperature of cream.....
Hours held at this temperature.....
7. Churning temperature.....How long held at this temperature
before churning
8. Acidity of cream at churning.....
9. Pounds of cream churned.....Percent fat.....Pounds fat.....
10. Time required to churn.....
11. Temperature of buttermilk.....
12. Size of butter granules.....Condition { Soft
Medium.....
or Firm.....
13. Percent fat in buttermilk.....
14. One or two wash waters.....Temperature of each.....
15. Number of revolutions in each wash water.....
16. Working, revolutions.....or time.....
17. Pounds butter churned.....Pounds salt used.....
18. When and how was salt applied.....
19. Amount of color used per 100 lbs. butterfat.....
20. Percent of moisture.....salt.....Overrun.....

The sample of butter represented by this entry blank and entered in the educational butter scoring was made by me at.....
and was taken from a regular churning for which the cream was not specially graded.

.....Buttermaker.

RULES GOVERNING THE 1919 EDUCATIONAL BUTTER SCORING.

1. Six or seven scorings will be held on the following dates: Saturday, February 1st; Thursday, April 3rd; Thursday, June 5th; Thursday August 7th; Thursday, October 2nd; Thursday, December 4th, and if a seventh is held ample notice will be given of the time and place.

2. These six scorings will be held at the Dairy Department of the State Agricultural College, Burlington, Vt. and all entries must be sent by prepaid express or parcel post to Prof. H. B. Ellenberger, Morrill Hall, Burlington, Vt. All entries must arrive in Burlington not later than the day previous to the scoring.

3. Each entry should contain five one pound prints or preferably a five pound box of butter and be neatly and carefully packed. Deductions in score will be made for discrepancies in weight or dirty or poor packages.

4. Each entry must be taken from a regular churning and not made from specially graded cream. A statement to this effect which will be found in the entry blank must be signed by the buttermaker if the entry is admitted to competition. Entries without this signed statement will be scored but not entered for a prize or certificate. The butter may however be made from graded cream if it is the custom to grade all cream received at all times.

5. Entry blanks filled out as fully as possible must be sent for each sample and only one entry for competition will be allowed to each creamery or farm dairy.

6. The prizes for the year will not be awarded to any competitor entering less than six samples and the placing will be determined by averaging the scores received on six samples.

7. To receive a certificate six samples all of which score 90 or over must be entered.

8. In case of ties for places in the individual scorings or for the year prizes will be awarded by the drawing of lots by a disinterested party.

9. Since the first scoring will be held at a time when it will be impossible for those buttermakers who attend the short course at Burlington to enter samples a special scoring will be held on February 13th for entries from these men.

**ANNOUNCEMENT OF THE FIRST EDUCATIONAL
BUTTER SCORING FOR THE YEAR 1919.**

The first educational butter scoring for the year 1919 will be held at Morrill Hall, Burlington, Vt., on Saturday, February 1st. This is the last day of the buttermakers' short course and those in attendance will be expected to be present. It is also expected to have samples of Southern and Western butter on exhibition for comparison with our Vermont butter. Samples made during the short course will also be included.

This will be an unusual opportunity for buttermakers of the state to sample and judge their own butter in comparison with that from other creameries and other states and it is hoped that all who can will plan to be present for this scoring Saturday morning February 1st. Mark this day on your calendar and be sure to come. After the regular scoring the buttermakers present will be asked to score several samples of butter and a suitable prize will be awarded to the person doing the best scoring.

Prizes will be awarded to buttermakers entering samples in this first scoring as follows:

CREAMERY CLASS.

First, choice of

A Fountain Pen or

Two New Books—{“Butter”, by Guthrie
“Cheese”, by Thom & Fisk or
Two New Books—“Cheese”, by Thom & Fisk or
6 Teaspoons (50 year Community Silver.)

Second,

“Book of Butter”, by Guthrie or
“Book of Cheese”, by Thom & Fisk or
Cold Meat Fork (50 year Community Silver.)

Third,

Sugar Spoon, (50 year Community Silver or
Butter Knife, (50 year Community Silver.)

DAIRY CLASS.

First choice of

“Book of Butter”, by Guthrie or
“Book of Cheese”, by Thom & Fisk or
A Jelly Server, (50 year Community Silver) or
A Cream Ladle, (50 year Community Silver.)

INFORMATION REGARDING THE 1919 EDUCATIONAL BUTTER SCORING.

During the past year under a cooperative agreement the State Department of Agriculture and the Extension Service of the University of Vermont and State Agricultural College have conducted a successful Educational Butter Scoring. A total of 400 samples were received and scored. So many requests asking that these scorings be continued have been received that it has been decided to continue them during the year 1919, but bi-monthly instead of monthly.

Samples from both creameries and farm dairies will be received but in separate classes.

A sterling silver cup donated by Hon. E. S. Brigham, Commissioner of Agriculture will be awarded to the buttermaker and creamery receiving the highest average score on six samples. This cup is to become the permanent property of the buttermaker or creamery which first wins it for the second time. It was won in 1918 by W. A. Vancour and the Lamoille Valley Creamery. In addition to this it is expected that arrangements will be made whereby it will be possible to award gold, silver, and bronze medals or other suitable prizes to the creamery buttermakers ranking first, second and third in the yearly competition and also a suitable prize to the farm buttermaker ranking first in his class for the year.

Certificates will be granted to each buttermaker, creamery and farm entering six samples none of which score below 90.

It is also hoped that a way may be found to award prizes to the buttermakers for each of the six scorings as follows; creamery class, first, second, and third and first in dairy class.

Each creamery sample of butter entered will be sampled and the composition determined. It is proposed to furnish the party making entry with the percent of water, salt, casein and fat but names will be omitted from any published reports of the composition.

Each party entering dairy butter will be furnished with a statement giving the percent of water and salt which it contains.

A detailed statement of scores, criticisms, and recommendations will be returned for each entry as promptly as possible after the scoring.

After scoring and testing the butter will be sold and a check for the net receipts will be sent to the party making the entry.

A summary of each scoring will be distributed which will include a list of all entries which score ninety or over. No names or scores will be made public of those samples which scores less than ninety.

The contest will be held under the supervision of the Director of Extension Service and the Commissioner of Agriculture. Prof. H. B. Ellenberger of the Dairy Department of Agricultural College will be in direct charge of the work and correspondence should be directed to him at the University, Burlington, Vermont.

Anyone intending to send samples to the scorings should read carefully the rules governing same a copy of which is attached hereto. These will be sent to anyone interested upon application to Prof. Ellenberger.

THURSDAY FORENOON SESSION.

PRESENTATION OF "BRIGHAM CUP."

MR. M. R. TOLSTRUP: *Mr. Chairman, Ladies and Gentlemen:—*

I am asked to present a sterling silver cup, the gift of our Commissioner of Agriculture, Mr. E. S. Brigham, and which I hope will be called the "Brigham Cup," to the Creamery who wins it as the result of producing the highest scoring butter in the State of Vermont. It is the first cup of its kind to be offered and it goes to the Manager of the largest Co-operative Creamery in our State, Mr. Jennings of the Lamoille Valley Creamery at East Hardwick. I will ask Mr. Jennings to come forward to claim the cup and will also make the request that Mr. Vancour, who manufactured this highest scoring butter to come forward, that they both may be seen.

MR. JENNINGS: This certainly is one of the happiest moments of my life. I am not a public speaker but I must say that this surprise has given me a thrill something like I had when the doctor announced to me that the fifth child was a boy. I don't think the creamery should have the full credit as we have certainly had a great deal of assistance from Commissioner Brigham, Mr. Jones and Mr. Tolstrup. Had we not followed their instructions and tried faithfully to perform our work in the way they outlined it for us, this cup today would not have been ours.

We certainly are a large creamery, having about 400 patrons, who send us their cream, and for 25 years we have operated as a co-operative creamery. Every dollar of money received for our product goes to the producer except what is actually paid out for running expenses of the plant and one-half percent which goes into a sinking fund reserved for taxes, depreciation of property and new machinery.

THE FUTURE OF VERMONT'S DAIRY INDUSTRY.

E. S. BRIGHAM, COMMISSIONER OF AGRICULTURE, VERMONT
DAIRYMEN'S ASSOCIATION, BURLINGTON,
JANUARY 16, 1919.

The beginning of a war always means the readjustment of industry to meet abnormal demands; the ending of a war, a reconstruction of industry to a peace time basis. Since dairying is the most important single industry in Vermont, a discussion of the question of that industry's future is timely at this session of the Vermont Dairymen's Association held at the close of the greatest of all wars. Although I do not wish to pose as a prophet, I shall attempt to present some facts regarding the effect of the war upon dairying and to draw some conclusions which I believe we may justly draw from these facts.

EFFECT OF THE WAR UPON THE DAIRY INDUSTRY.

Our entry into the European war in April 1917, two years and eight months after its outbreak, found our dairy industry struggling under a very heavy burden. The Allied Governments had become heavy purchasers of grains in our markets so that the concentrated feeds ordinarily employed in dairy feeding had become very high in price. The demand for labor on the part of manufacturers of munitions had drained labor from the farms to such an extent that there resulted a decreased efficiency and an increased cost of that labor which was left. In the meantime, no increase in price of dairy products commensurate with the increased cost of production, had taken place. The Food control Act was passed by Congress in August 1917 and Herbert Hoover, already recalled from Europe for the purpose, was immediately appointed Federal Food Administrator by the President. Few men have had to solve greater problems than did this man when he assumed the duties of Food Administrator of this country, which was called upon to supply the surplus food with which to keep the European allies from starving. Food control in Europe had not been a great success and no European Food Administrator had held office for a very long period. Therefore, there

were very few precedents to guide Mr. Hoover in the great work which he had undertaken. The problems which he faced were pressing, especially after the disappointing harvest of 1917, and he was compelled, without much time for reflection, to make decisions of great importance and to take actions affecting long established customs of commerce which had the most far-reaching consequences.

The early program of the Food Administration, as regards dairy products, has brought forth some criticism from dairymen. How it happened is not clear, but at any rate, the impression got abroad in the country, in the fall of 1917, that it was the wish of the United States Food Administration that the public save milk and other dairy products. Appeals of this nature were printed on the menus of the dining cars and of the leading hotels of the United States. Manufacturers of oleos were quick to seize the opportunity to appeal to the patriotism of the public to save butter and use oleo in its place. Perhaps the result would not have been so disastrous to the dairy industry if the channels of transportation had been open so that we could have had the benefit of the allied demand. But the activities of the German U-boats became so great in the winter and spring of 1918 and so reduced the available tonnage of shipping that, when the surplus period of dairy production arrived, shipments of dairy products were limited to six thousand tons per month. The net result was that we had last spring a great accumulation of condensed milk and cheese, a smaller surplus of butter and a price, in my opinion, below cost of production. In December 1917, the Food Administrator, fearing that the differences between the producers and distributors of market milk would lead to disastrous strikes and interrupt the city supply, endeavored to compose all differences between these parties through the medium of regional milk commissions, which were instructed to fix the price of milk on the basis of cost of production plus a reasonable profit to the producer and cost of production plus a reasonable profit to the distributor. I believe the milk commissions tried to be fair to all parties concerned and their awards during the winter of 1918 were generally satisfactory. But in the spring, when the surplus season approached, the low prices of butter and cheese, of necessity, resulted in a compromise price to the producer somewhere between the cost of production and the manufacturing value of that part of the milk which had to be made into such products as butter and cheese. It was not until last September when shipping conditions improved, so that the European demand could be felt in our markets,

that the price of all dairy products rose to a point where, in my opinion, the fairly efficient producer received his cost of production plus a reasonable profit and the dairy industry was in a good, healthy condition.

The effect of the conditions which I have enumerated, viz., high prices of feed and labor, with comparatively low prices for dairy products, had a very marked effect upon the dairy industry of Vermont. Our census of live stock taken by the listers in the spring of 1918 showed that in the year from April 1, 1917 to April 1, 1918, the number of milch cows for the State had increased 2.5% and the number of other neat stock had increased 18%. Our reports from the creameries, cheese factories, shipping stations and condensaries for the year 1917 show that the production for 1917 had materially decreased from the production of 1916. Reduced to butterfat, this decrease equals, in product handled through the plants alone, 7,305,800 lbs. of butterfat, or approximately 9,000,000 lbs. of butter. This shows that high feed and labor prices, coupled with low prices for products, resulted in a materially decreased production. It is quite probable that this same condition will continue during 1919, because the rise in price occurred too late in the year to offset the higher prices for concentrates and labor and the effects of our reduced hay and corn crops.

WE MUST RECONSTRUCT THE INDUSTRY.

During these war years, the dairyman has been doing a great deal of thinking and in the future will undoubtedly demand a reconstructed industry. In an address to the Pittsburg Press Club last April, Mr. Hoover said: "As I have seen this war develop from an active participation in its back-wash and misery since its first day, I have seen growing out of the masses of people in every country aspirations for a great economic change." In an address to the editors of the agricultural papers of the country, Mr. Hoover stated the opinion that the undue migration from the farms to the towns, which had taken place during the past 25 or 30 years, was founded on the basic economic fact that agriculture has been less profitable than industry and said, "In fact, a large part of our agricultural production has been based on sweated labor." No one can sympathize more with this latter statement than the dairyman who has been accustomed to perform the labor in caring for the dairy before and after what is considered to be a normal day's work for other classes of people and at a compensation averaging less than that paid for work re-

quiring similar skill in other occupations. Since the war began, the farmers of this country have been studying costs of production, including labor, over-head expenses, etc., in a way which has given them a new insight into their business. The prices demanded by our eastern dairymen, in my opinion, have been moderate and not in excess of what society ought to be willing to accord them. The drivers of milk carts in the city of Boston are now receiving salaries and commissions approximating \$35 per week. Assuming that the service rendered is not more than 60 hours per week, this is a charge of 58c per hour for a service rendered in the distribution of milk and this charge society pays uncomplainingly. The Warren formula states that four hours of human labor are, on the average, required to produce 100 lbs. of milk. I think we may fairly assume that a man who is competent to feed and milk cows must be of as high grade of intelligence as a man who is competent to drive a milk cart. If we allow the same price for labor in the production of milk that we allow for a service of equivalent grade performed in its distribution, we will have \$2.32 for simply the labor involved in producing 100 lbs. of milk or a cost for this one item of expense equal to the total pre-war price of milk. If society concedes to labor a short day and a high wage (and I do not mean to argue at all that it should not make such concession) society must take into consideration that the farmer must pay wages equivalent to those paid by other industries if he gets men to work for him on the farm and society must pay high enough prices for farm products so that the farmer can afford to pay these wages, else the farmer must stop producing.

In this connection, L. H. Bailey, former dean of the agricultural department of Cornell University, said recently: " * * * We are willing to pay more for pig iron, for shoes, for furniture, for books, for transportation, if only fair standards of living may be maintained. No one raises a voice for cheaper workshop commodities for the benefit of the consumer at the expense of the worker. Yet the public still wants cheap food."

" * * * The demand for cheap food is fallacious. Pressing down the cost of food has one or all of three results on the producers of it. We reduce the standards of living of the producers; we exploit the cheap labor or cheap lands of new or remote countries; or we live on the products of the peasantry of other countries.

" * * * We cannot forever scatter over the earth and pick up our supplies. Labor is becoming mobile, agricultural

labor with the rest. It goes where rewards are greatest, and this means that rural labor goes to the cities and to industries.

"* * * Rather than try to force down the cost of farm supplies to old levels, we must remember that these old levels have often been too low, and that our problem now is to place them where they belong, in relation to other values."

WILL HIGH PRICES FOR DAIRY PRODUCTS CONTINUE?

If we assume that present prices for dairy products are fair, the question of immediate concern to the dairy farmer is, will high prices for dairy products continue until costs of production decrease? Since the immediate cause of the present high prices was the European demand, the maintenance of these prices will, of course, depend upon a continuation of that demand. We have been led to believe that the herds of Europe have been very greatly depleted. From the information which I am able to obtain, I believe these reports have been exaggerated in so far as dairy cattle are concerned. On December 31, according to the information in possession of the Food Administration at Washington, the dairy cattle of France had been depleted 20%, the dairy cattle of England 1% and the dairy cattle of Italy one million. Belgium, Servia and the portions of other countries which suffered from German occupation must have greatly depleted herds. No reports have been received regarding conditions in the Central Powers. It would seem that the European governments had recognized the necessity of maintaining their dairy herds and had made every effort to keep them intact and to provide a normal growth of young stock for the future. It is true that production has been greatly decreased because a normal feed ration has not been available. In fact, one neutral country is said to have used ground wood pulp as a part of the ration to maintain its dairy cattle during the period of feed shortage. It seems to be the general opinion among those who are in best position to know that Europe will not make as great a demand on us for dairy stock as was anticipated but will gradually build up its herds to pre-war numbers and to normal producing capacity and in the meantime will depend upon us for supplies of dairy products. It may be expected that the herds of Europe will be on short rations until another spring at least and that it will be a year or two before normal production is restored. If this is true, there will still be a demand upon us for our surplus dairy

products, which should maintain a fair price through the coming season.

CAN DAIRY INDUSTRY BE MAINTAINED BY HOME MARKET?

Even if we do have a temporary demand from abroad, we must expect ordinary prudence to suggest to the European countries the wisdom of supplying themselves with dairy products as soon as possible. We must, therefore, face the problem of maintaining our dairy industry by the utilization of our dairy products in our own markets. If we compare the average shipments of condensed milk, butter and cheese for 1917 and the first eleven months of 1918, with the average shipments of the three pre-war years, we will find that the increase in such shipments was not a large percentage of our total output of dairy products. It would seem, then, that our problem of increasing consumption here at home so that we could use our entire production would not be a difficult one. I say it would not seem to be a difficult problem because of two reasons: First, because of the knowledge gained of the value of dairy products as a result of practical war rationing and second, because of the newer scientific knowledge of nutrition.

1. The general shortage of food has led, in most European countries, to a definite rationing and in this country to an appeal for conservation, which has led almost to a rationing. In Great Britain the shortage of milk led to an apportionment of the supply on the basis of giving an adequate amount for young children and a consequent restriction of the supply for the adult population. In fact, it was made an offense punishable with a fine of five pounds for an adult patron of an eating house to buy a glass of milk as a beverage or for a proprietor of such place to make the sale of a glass of milk. The children of Great Britain had more milk under war control than in pre-war days. The British Medical Association found that the death rate among infants under five years of age, under this system of adequate milk feeding, was about one-half the rate in pre-war times. In New York, the higher prices for milk resulted in a decreased consumption. An investigation was made of 829 families in which the daily amount of milk was reduced and it was found that 2,090 children under six years of age, who were having a decreased amount of milk, were either not gaining in weight or were actually losing in weight. The Food Administrator of Great Britain, Mr. Clynes, himself a labor leader, made the statement:

"Milk is so indispensable a food for which substitutes cannot be found if children and women are to be properly fed, that I would rather give a few extra coppers to milk producers than run the risk of any serious milk shortage because of our failure to offer an encouraging price for its production. In respect to some branches of their work, dairy farmers and others employed in agriculture have unusual difficulties to overcome. I would rather be blamed for fixing a high price than take any step which would bring us near a milk famine. The very poor who are not able to pay any higher price can get it free or at a lower rate."

2. Co-incident with this practical knowledge regarding the value of milk in human nutrition gained through war rationing, was the discovery of the scientific reasons why milk and dairy products are so valuable in the human diet.

Certain experiments carried out at the University of Wisconsin at the suggestion of Dr. Babcock gave results which cast some doubt upon some of the old theories of nutrition. A theoretically perfect ration, containing an abundance of protein, carbohydrates, fat and mineral salts, made up of certain combinations of feeds, did not produce growth and enable reproduction to take place. Dr. McCollum and his associates attacked the problem of finding out why this was so. The result was discoveries of inestimable value to the dairy industry.

For many years the dairyman has feared the competition of butter substitutes. Oleomargarine has for many years been a strong competitor but animal fats were required in its production and there was a limit to the amount which could be produced. Recently vegetable fats have been used to replace animal fats in a butter substitute called "nut butter" and there is practically no limit to the amount which can be produced. The oleo manufacturers have always maintained their product was just as valuable in human nutrition as butter made from butterfat produced by the dairy cow. The dairyman disputed the claim but had no conclusive scientific evidence to support it. McCollum and his associates found in their experiments in feeding purified and isolated food stuffs to young rats, "that growth could be secured when the fat in the food mixture was butterfat, whereas no growth could be secured when the butterfat was replaced by lard, olive oil or other vegetable oils. Certain fats contain some substance which is not dispensable from the diet, whereas other fats do not contain the dietary essential." The oleo manufacturer still

makes his claim through clever advertising that his substitute is as good as butter and much cheaper, but when the dairyman meets this advertising line for line with material setting forth the true value of butter, I believe the substitute may be driven from the field.

Dr. McCollum and his associates found that there were two unidentified dietary essentials, named by them fat soluble A and water soluble B, which must be supplied in the diet if normal growth is secured in the young and a normal state of well-being is maintained in the adult. A diet made up of seeds and their products and of meat has a deficiency of these substances and will not support normal growth and well being. This deficiency may be made up by the use of milk, eggs and the leafy vegetables, which foods have been named "protective" foods because by their use a condition of well being is maintained which will keep the human animal, free from certain diseases and less likely to contract others. McCollum states in his recent work on the "Newer Knowledge of Nutrition" that :—

"* * *Milk is without doubt our most important food-stuff. This is true, because the composition of milk is such that when used in combination with other food-stuffs of either animal or vegetable origin, it corrects their dietary deficiencies."

He states further :—

"* * *An examination of any large groups of people in the cities, will show that where there is a high mortality from tuberculosis, milk is not being used to any great extent, and in any large group where milk purchasers are large this disease is not a menace."

We have, therefore, the highest scientific authority that milk and dairy products have a value in human nutrition apart from the protein, carbohydrates and fat which the chemist has always told us they contain and that in practical nutrition these products are indispensable if we are to develop a strong race. If C. W. Post had had similar high scientific testimony in regard to the health giving properties of Postum, can we imagine what would have been his volume of sales? Can we imagine what the sales of milk and other dairy products will be if the dairyman will but let the public know how valuable his product is?

If the dairymen of the Eastern States will utilize the advertising value of the discoveries above enumerated, what are the possibilities of consuming in our home markets, at good prices, all the dairy products we are producing? In the New England and Middle Atlantic States there prob-

ably are today 30,000,000 people. Dietitians say that children under six years of age should have a quart of milk daily, children from six to sixteen should have at least a pint daily and adults one-third of a quart. If the age division of the population of these Eastern States is approximately as it was in 1909 and if the consumption of milk could be increased to the point which is desirable for the well-being of this population, we would have a consumption of 13,000,800 quarts of milk daily or a yearly consumption of 5,037,000,000 quarts. The number of cows in the New England and Middle Atlantic States in 1909 was approximately three and one-half millions. Since the number of cows decreased between 1899 and 1909, I think we may fairly assume that the number has not increased in the ten years since 1909. Assuming an average production of 2,000 quarts per cow, we would have a production from the herds of the New England and Middle Atlantic States of seven billion quarts, or enough to supply the milk for the population of these States and a surplus sufficient to supply the cream for one cup of coffee a day for twenty million people who use as much cream as I do in my coffee each morning. This would leave the entire supply of butter, cheese and cream for cereals and cream for ice cream to come from outside territory. Our problem, then, is simply to encourage the people of these eastern States to use as much milk as they ought to use for the good of their own health in order to insure a bright future for our dairy industry.

At a meeting of representatives of the dairy industry held in Chicago last summer, a committee of seven was appointed to draw plans for the future development of the industry. This committee has recommended that dairy councils be formed in the several states to raise money for advertising purposes to encourage the use of dairy products. If we could organize the dairy industry that the same percentage of sales of dairy products could be raised for advertising that the Orange Growers' Corporation of California devotes to the purpose of advertising citrus fruits, I believe that the people of our own country would take that surplus which we are now sending to Europe, so that when the European demand falls off, we could maintain a fair price upon the basis of the demand from this country alone, and thereby insure the financial success of our own industry.

The time for action is at hand. The United States Food Administration has announced that it will no longer continue to use its powers to control milk prices when

existing agreements terminate. The New England Regional Milk Commission will operate until April under existing agreements. Federal Control ceased to exist in New York in December and a milk strike promptly followed. The spring surplus period will soon be upon us with all the dangers of unprofitable prices unless intelligent action is taken. Two courses seem to me to be open. They may be characterized as the course of compulsion and the course of persuasion.

Dairymen may compel society to pay fair prices for milk, if their organization is strong enough, by the strike method which has been so successfully used by labor. This means with holding from the public a supply of milk until the public meets the price demanded. There are circumstances under which such a method must be employed but in my opinion the good of the dairy industry demands that it should be employed only in case of extreme necessity and not be adopted as a permanent policy. The importance of milk, especially in the proper nourishment of children, will always lead to certain sentimental considerations in the matter of price. The public should not and will not submit to profiteering on the part of either producer or dealer in supplying so important a commodity as milk. I believe the dairy industry will find the methods of compulsion and coercion as a permanent policy detrimental to its best interests. On the other hand, I believe the public means to be fair if it knows all the facts. The people of Boston last summer, with little complaint, bought milk at a price which would have been considered prohibitive two years ago simply because the price was determined by a commission in which the people had confidence and the value of milk as a food was advertised by producers and dealers in cooperation. I believe a program of the organized dairymen which contemplates the production of milk of standard quality, the control of the country facilities for handling milk, so that bargaining power may be secured and surpluses manufactured in the most economic manner, and the advertising of milk and other dairy products, so that people may be persuaded to use more and thereby create a demand,—I believe that such a program may accomplish everything by peaceful means which the other method can hope to accomplish by force and has great possibilities for providing a bright future for the industry which is the very foundation of the prosperity of the farmers of Vermont.

THURSDAY AFTERNOON SESSION.**COW TESTING WORK IN VERMONT.**

H. E. BREMER, AGENT IN DAIRYING.

Your chairman has asked me to say a few words this afternoon in regard to the cow-testing work in Vermont. Since I am not familiar with your conditions except in a general way, I will speak rather briefly. Traveling from farm to farm, I have noticed that a great many herd books show an average production of from 4,500 to 5,000 lbs. of milk per year. Almost any sort of a cow can do that well and I'm sure you dairymen here in Vermont will want to do better because your reputation is not that bad. This needed improvement can be derived from the cooperative cow-testing association.

The subject of cow-testing associations has been quite thoroughly discussed in the dairy circles of Vermont for the past few years. We can congratulate ourselves upon the fact that until recently Vermont had more cows under test in proportion to cow population than any other state. I am sure that after such a record, we will not give up but will set our goal still higher for the future.

What I have to say is not new. Feed prices and prices of dairy products are higher than ever before and as a result we can win or lose quicker in the dairy business than ever before. Let's put our herd on a business basis and make them win. What we need most is not so much larger herds but higher producing individuals more intelligently fed and managed. The purpose of the cow-testing association is to assist in accomplishing this very thing. By obtaining a yearly record on each cow in the herd, the unprofitable cows can be disposed of, thus raising the production in a smaller herd. By this system, we not only remove the poor cow but the records show up the high producers as well and from these it is possible to develop a uniformly high producing herd. A well bred sire will help bring about this result.

Is this not a great advantage? The owner of cattle with cow-testing association records invariably receives a higher price for his surplus stock than does the man who

can show no records. Cows are sold today not on show ring success but on their performance. A record gives one a basis of establishing prices on surplus stock as well. It is not uncommon to receive \$25.00 to \$50.00 or even more for a grade cow having a record than for a cow just as good without the record. Very often there is a still wider margin in selling heifers, whose dam has made a high association record. The cost of belonging to the cow-testing association is often met in just this one way alone.

By the use of a well-bred sire from uniformly high producing ancestors, which we can also locate by means of these records, we can in the course of a few years, more than double our income over the cost of feed. We have an example of progress in this direction illustrated in a herd belonging to a Vermont cow-testing Association. I will not mention the owner's name but here are the actual figures: The average milk production in 1913 was 4,802 lbs. and 168 lbs. of butter fat,—slightly above the average dairy cow in the U. S. The feed cost was \$34.00 and the net income over feed was \$22.00. After being in the association four years with the aid of the cow-tester in balancing and feeding more economical rations, this same herd of a dozen cows produced an average of 5,975 lbs. of milk and 239 lbs. of fat. A considerable advance in feed prices had taken place during this period, yet the increased cost of feed per cow was but \$7.00 while the average income over feed cost had advanced from \$22.00 to \$75.00 or more than trebled in these four years. This dairyman studied his herd book and had fed a more economical balanced ration. He also sold his scrub bull and purchased a registered one.

In this connection, I wish to state that the average production of the 23 million dairy cows in the U. S. is estimated to be almost 160 lbs. of butter fat and 4,000 lbs. of milk per year. Of the 22,000 cows in 70 different cow-testing associations studied in 1918 the average production was 249 lbs. of butter fat and 5,831 lbs. of milk per year. The value of the increased product will more than pay for the cost of testing in the average size herd.

Those of you who heard Mr. Kelley Tuesday evening and Mr. Pattee yesterday afternoon I'm sure are convinced of the value of advertising. What these gentlemen said in regard to advertising dairy products in order to bring about greater consumption holds equally true in regard to the production side. A man is known by the goods he sells. If he can place before the public, cattle with recognized records, there is no doubt but that he will dispose

of them. We hope to circulate a letter to every association member announcing the accomplishments in every Vermont cow-testing association. This method has brought results in other states and there is no reason why it will not do the same here.

In my opinion the prospects for testing were never brighter than right now. We have had the experience and know what can be accomplished. We know that helps from a tester will lead to feeding a balanced ration and so reduce your cost of producing 100 lbs. of milk. Anyone "*knows*" that you can sell a cow backed by a 300 lb. butter fat record at a higher price than you can a cow just as good but one which you "*think*" produced 300 lbs. butter fat. Cow-testing takes the "*think*" out of the business and at the end of the year you "*know*" what each cow has done by her records.

WHY USE THE PURE BRED SIRE.

BY O. M. CAMBURN.

Since one of the great laws of heredity is that like begets like, should not the dairymen use pure bred registered sires more than they have in the past?

Recently the agricultural press has had considerable to say about the future of the dairy industry. The great demand from overseas for all kinds of dairy products has been on the increase and will probably continue for some time. Commissions from other countries have visited the United States to look into the dairy situation here and arrange for the purchase of pure bred stock to replenish their depleted herds. This demand is not likely to be large.

The great market for our dairy products is right here at home. Greater and more thorough advertising of the economic and food value of dairy products will cause a greater demand and increased consumption.

The farmers of the south are turning to live stock raising. There is a rapidly increasing demand for dairy stock to be used as foundations for dairy herds. Each year sees the quality requirements raised. In one community, eleven (11) carloads of Holsteins were purchased. This train-load of cattle went direct from the farmers of Wisconsin to the farmers of Mississippi. More recently two (2) carloads of pure bred Guernsey cattle were purchased in another Mississippi town. Louisiana has been buying in carload lots for some time. Only a few months ago the State of Kansas sent a representative to Vermont to purchase two (2) carloads of Ayrshire cattle for one of the state institutions. Two (2) carloads of Jersey cattle have been shipped from Windsor County, Vermont, one going to Ohio, the other to Illinois. Therefore the market for our pure bred and high grade cattle is in the United States. We have here in Vermont surplus cattle, but we need to advertise them and sell direct to the dairy farmers of other sections.

A recent report from the Federal Department of Agriculture places the number of milch cows in the U. S. as 23,300,000. The dairy division estimates, one third (1-3) of these animals are unprofitable. They are not paying

for the feed they eat, to say nothing about the labor and money invested. Herein lies one of the factors of the high cost of milk production. These "slacker" cows can be discovered and disposed of through the keeping of records, done by the cow testing associations. These associations have done and are doing a great work in culling out these "boarders". There is a limit as to the number of cows which these testing associations can reach. Of the 23,300,000 cows in this country, only 5,000,000 stand in herds of 12 or more cows to the herd. This leaves 18,000,000 cows in herds smaller than 12 cows per herd. Very few herds containing less than 12 cows are in cow-testing associations. These smaller herds need the benefits of association work just as much as do the larger herds, but must look to some other means of increasing the production.

Pure bred sires must be used on these 18,000,000 cows if increased production is obtained. The great mass of dairy cattle have a certain average ability as producers. These cattle might be divided into high producers and low producers, measuring from the average of the whole. The class of low producers, those below the average, will be large and the class of high producers relatively small. The question is, will the additions be greater to the high producers or to the low producers. When left to itself there will be a constant increase to the class of low producers, those below the average, and little if any increase in the high producers class. Nature when left to itself tends toward lower production. The dairy farmer will therefore obtain increased production by the use of carefully selected purebred sires.

Many dairymen are not using registered sires, although they do look for a bull calf, as a future herd sire, from a good producing cow, either in their own herd or in a neighbor's herd. They recognized the importance of increased production. The dam influences but one offspring per year, while the bull used in a herd influences many offspring. The statement is made that the bull is half the herd, but in view of the greater number of animals which he influences is he not more than half the herd?

Sires can be divided into three classes, registered, grade and common. A purebred or registered animal is one whose parents are both registered. The grade is an animal one of whose parents is registered. With the common stock neither of the parents are registered animals. The mating of grade animals does not give an upgrading but results in common animals.

The natural tendency is toward lower production, therefore all effort must be made to increase production. The registered sire should be used because of his greater ability to transmit his producing qualities. Unfortunately there are in all breeds some registered scrub animals. To be sure of obtaining sires of the desirable kind, the dairyman should insist on high production back of the bull which he is buying. The bull should not only be registered, from high producing dams but also of good individuality. No bull whose dam and parental grand dam were not capable of producing 300 pounds of butterfat or more in a year, should be used. The far seeing dairymen select bulls from dams which have produced 400 pounds or more of butterfat yearly. A question that is often asked is, "Can a good herd be produced from a herd of common cows, by using a pure bred bull?"

An investigation has been carried on for a number of years at the Iowa Experiment Station to answer this question. They recognized as all good dairymen do, that an ample supply of good feed must be provided to insure a steady flow of milk. Therefore the animals used in the experiment were given the same care and feed as the other animals in the dairy barn.

For a foundation, scrub cows were selected from a region where no purebred sires had ever been used. Careful milk and feed records have been kept during the entire experiment. Purebred sires of the Guernsey, Holstein and Jersey breeds were used on these scrub cows and all heifer calves were grown under the same condition as the other calves on the dairy farm. The bulls used were well bred from the production standpoint, and are of the kind which progressive dairymen can afford to buy. The results of this work are shown below. The records pointed out a greater increase in production in the second generation than in the first generation.

Bull Used	Dams' Average		Daughter Average		Granddaughter Average	
	Milk lbs.	Fat lbs.	Milk lbs.	Fat Lbs.	Milk lbs.	Fat lbs.
Holstein	3255	161	6311	261	11295	431
Guernsey	4168	186	4634	218	7091	355
Jersey	3903	186	5400	287	5479	291
Average of all	3775	178	5448	255	7955	350

The average yearly production of all daughters regardless of breed shows an increase over their dams of 1,673

pounds or 44.3 percent in milk and 77 pounds or 43.2 percent in fat. In the second generation the increase was 2,567 pounds or 46% in milk and 104 pounds or 40.8%.

Stop and consider what this means to a herd. With ten heifers increased in production 50 pounds of fat per year at an average price of 50 cents per pound they would return \$250.00 more than their dams. Every herd can afford the service of a registered sire from high producing dams.

TUBERCULOSIS AND ABORTION

DR. H. E. SMITH, VETERINARY INSPECTOR, U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

Tuberculosis and abortion disease are exacting an enormous tribute from the live stock interests of our country. During the fiscal year ending July 1, 1918, 222,787 cattle and 3,495,188 hogs were found on post mortem examination at the abattoirs under federal inspection, to have tuberculosis. As this disease has been on the increase, it was with the idea in mind of aiding the stock raiser in maintaining his herd free from these diseases, that the Division of Tuberculosis Eradication of the United States Bureau of Animal Industry was established in July of 1917. This division is cooperating with the Dairy Division and the various State departments in establishing and maintaining bull associations and sow-testing associations that are free from infectious diseases, especially tuberculosis.

The plan for the control of tuberculosis in these associations is the same as that followed in the testing of herds of pure bred cattle for the accredited herd list. According to this plan, a tuberculosis-free accredited herd is one which has been tuberculin tested by the subcutaneous method or any other test approved by the Bureau of Animal Industry, under the supervision of the Bureau of Animal Industry or a regularly employed veterinary inspector of the State in which cooperative tuberculosis eradication is conducted jointly by the United States Department of Agriculture and the State. Further it shall be a herd in which no animal affected by tuberculosis has been found upon two annual or three semi-annual tuberculin tests as above described, and by a physical examination. These associations can avail themselves of the publicity which is to be obtained through the issuance at frequent intervals by the Department of Agriculture of accredited herd lists. These contain the names of those breeders whose herds are regarded as free from tuberculosis. 50,000 copies of the last list which contained about 1,100 breeders, were distributed to State extension departments, agricultural colleges, county agents, and others who might wish to purchase cattle free from tuberculosis.

Already in one community over 200 herds are under supervision, according to the accredited herd plan, and sales are now being held in which only animals from these herds are listed.

From these associations the work is spreading until it is in some instances becoming county-wide, and we will eventually have entire States, and finally our whole country freed from this insidious disease.

Bull associations and cow-testing associations, established in Vermont, by communicating with Dr. A. J. DeFosset, Care Commissioner of Agriculture, State House, Montpelier, Vermont, may obtain information on the method of procedure to obtain assistance in establishing tuberculosis-free herds and associations.

Abortion can be controlled by precautionary methods, and advice and assistance will also be rendered by the same departments.

TUBERCULOSIS ERADICATION IN VERMONT.

**DR. A. J. DEFOSSET, INSPECTOR IN CHARGE AND DEPUTY
LIVE STOCK COMMISSIONER.**

Mr. Chairman, Ladies and Gentlemen:—

I have listened with pleasure to the various speakers before this association, and I have heard the dairy industry discussed from various angles. Particular emphasis was placed on an advertising feature campaign which is to be launched for the promotion of the industry by creating a larger demand for milk consumption. I believe that not enough attention has been given by the dairyman in the advertisement of his product. All great business enterprises have grown largely by, and through the advertising medium at their command.

Now, I have noted in the discussion here given that another matter of great importance has not been touched upon, and that is the health of the herd. We know that no business can thrive and flourish unless a healthy and sound basis has been established as a foundation. A diseased herd cannot and will not yield as profitably as will a healthy one, and I believe that it can be borne out by figures that it costs more to maintain a diseased herd than one that is healthy. Tuberculosis is one of the diseases with which we are most vitally concerned at this time in the state of Vermont.

I do not know if I dare tell you at this meeting of the extent of disease that is prevalent in some of our dairy herds. I do not know if it will cause you to become alarmed to the extent that you would fear a campaign of eradication or if it would stimulate greater activity among you in the control of this great malady so destructive to our dairy industry.

I believe, however, that you all are men who would not shun duty and if the true facts were known concerning the condition of your herds that you would not hesitate a moment in cooperating with us in the eradication of tuberculosis from herds in this state. It is not my intention to insinuate that this state alone is heavily infested with bovine tuberculosis. What is true with regard to disease in this state, also is true of other states.

Tuberculosis eradication is not new to Vermont live stock men. For twenty-five years a campaign has been waged in this state and enormous sums of money have been spent for the benefit of the live stock interests. While much good has been accomplished in this work during the past years, nevertheless the disease continued to spread for the reason that no systematic plan of eradication was followed. After herds had been freed from the infection no more assistance was given and because of lack of supervision and in some instances, carelessness of owners, the herds became reinfected from outside sources. Unscrupulous dealers, all very anxious to dispose of stock regardless of its health reinfected herds into which their sales extended. Thus the assistance given by the State while of good intent and purpose did not achieve the ends sought.

Some of the better breeders of live stock having regard for the maintenance and well being of their industry, through their representatives, and representatives of the United States Live Stock Sanitary Associations convened in Chicago in December, 1917 and there discussed a plan for the eradication of tuberculosis which is now in effect in forty-two states of the Union. The plan, known as the accredited tuberculosis-free herd plan was approved by the United States Bureau of Animal Industry which is cooperating with the several states in this important work and has assigned a large staff of trained veterinarians under the leadership of Dr. J. A. Kiernan at Washington. In addition to the Veterinary assistance given for the control and eradication of the disease a sum of money has been made available by Congress and assistance of this nature is given the various states who have provision for paying indemnity for cattle slaughtered because of tuberculosis, by paying owners one third the difference between the appraised value of an animal and the salvage thereof.

Your able Commissioner of Agriculture who is always abreast with the times, arranged with the Federal Government for cooperative tuberculosis eradication in this state, and while the work has been started but recently there are already nearly four hundred herds under State and Federal supervision in Vermont. Vermont ranks as one of the first states in the Union in the number of cattle tested each month.

This accredited herd plan has in view the application for a test from the owner who is required to submit his entire herd. He enters into an agreement with the State and Federal Government and cooperates under various articles of an agreement form which he signs. After the

herd has passed two annual tests or three semi-annual tests without reactors the herd is accredited as free from tuberculosis and a certificate to that effect is issued from Washington if the herd contains one or more pure-bred animals, or a state certificate if it consists of grade animals. This certificate will permit owners of such herd accredited, to ship animals interstate for the period of one year without retest. Also all herds having passed one or more tests without reactors are listed in a publication which is widely distributed among breeders of cattle.

In order to carry on a work of this kind systematically it is necessary to provide funds in order that the plan may not meet with failure. It is natural that owners of cattle desire indemnity for stock found diseased and subsequently slaughtered. This requires a considerable sum each year, and with the growth and expansion of the work we find that even now we have applications for testing that it may be necessary for us to hold over until the next appropriation becomes available. With the expansion of the work over larger areas, larger sums of money should become available until the disease is ultimately stamped out.

Your legislature is in session at this time and this is the opportune moment to appeal for such assistance as is necessary to meet with your requirements.

We are ready to receive your application for the testing of your herds and are at your service in this important work that can no longer be neglected. This work as I said previously is of a cooperative nature and we have not found it necessary to use force by quarantine, etc. There is a time not far distant, however, when a certain force will tend to bring many more breeders into the cooperative work and that will be through the channels of trade demand—a competitive force. Today the progressive breeder *will* cooperate and later the others *must*, because their fellow competitors will demand it.

To illustrate I wish to advise that only a few days ago a letter was received from the War Department stating that they wished to purchase one hundred and twenty-five head of heifers from herds under supervision and that have passed one test without reactors.

There is no doubt but what many more requests of like nature will be received from numerous localities and such requests will exclude all herds not under supervision for the eradication of tuberculosis. I again state that we will be at your service if you desire to cooperate with us in the eradication of bovine tuberculosis.

RECONSTRUCTION.

HELMER RABILD, IN CHARGE DAIRY EXTENSION, U. S.
DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

The world has just passed through the greatest destructive period of its history and, from all appearances, it is entering upon the greatest constructive period ever known. In this period of construction and reconstruction, farming will play a very important part, and among the farm enterprises dairying will have a prominent place.

Many guesses have been made as to the number of dairy cattle killed in Europe. It is only fair to say that they were only guesses. No reliable reports whatever have been received from what might have been Mittleuropa if our boys not been at Belleau Wood and at Chateau Thierry, or from the the area occupied by the enemy. A commission from this country has just returned from Europe and we shall be very much interested in the report it brings. It is hardly to be assumed, however, I believe, except in Belgium or the territory actually fought over, that a very great percentage of what we may term good seed stock has been sacrificed. Such dairy cattle as were killed for meat were undoubtedly from the lower end of the herds or the less profitable. I think we may expect that a strenuous effort will be made to replenish the herds remaining by breeding and saving of heifer calves. At present these herds are undoubtedly on short rations. I received a report a few weeks ago from Sweden on experimental feeding of wood cellulose and indicating that a good deal of this was being fed. Under such conditions the cows' milk production must be much below normal and it will take a good deal of time to bring them back to full production and longer to replenish the herds. During that time we will be called upon to supply a great quantity of dairy products both for Europe and for the increasing domestic consumption.

THE FUTURE NEEDS FOR PRODUCTION OF DAIRY PRODUCTS.

Some of our dairy thinkers have looked with concern upon the fact that the American people have consumed only 4 to 6 pounds of cheese per capita in a year, while some of

the European nations consume 17 pounds or more, and measures have been considered for increasing the consumption. Leaving out of consideration the immediate present when it looks as if we were facing a cheese shortage, I believe we will gradually but very materially increase our cheese consumption.

If I understand agricultural history rightly it seems that there are four distinct stages, well recognizable, of agricultural development. When the land is new and sparsely settled the growing of grains is generally the chief source of income and the diet of the people is based largely upon the grain foods.

Later, as the country develops, for big underlying reasons, necessity for maintaining soil fertility and other economic reasons, the growing of live stock on an extensive scale is resorted to. When a country finds itself in that stage of development we find that the average per capita meat consumption is very high. Australia and New Zealand, where the growing of live stock is practiced on an extensive scale, stand at the top of the list in per capita meat consumption with 262 and 212 pounds per annum respectively. The United States is third on that list with 180 pounds.

As population increases and land becomes more valuable, the large grazing areas are cut up into smaller tracts and dairying, a more intensive form of live stock husbandry, becomes prominent; meat increases in cost and the people gradually turn to the consumption of dairy products. Denmark and Holland, and some of the other northern countries are in that stage of development today.

There may be in my judgment still a fourth stage; when the population becomes so dense that there is no room for cows, people resort to the growing of intensive bread crops, vegetables, roots and other garden truck. Milk becomes rare, cows and bulls under such conditions have become the objects of reverence, and the human animal has taken the place of the horse for light transport.

In other places this evolution has been very gradual, covering hundreds of years. With us the first stages have been more rapid. As we look back we can see the first settlers growing grains for their principal food, and as the country developed take up the growing of live stock. As we think of the agricultural development of the United States can we not recognize three of these stages in the grain growing sections of the West, the live stock areas of the near West, and the dairy sections of the Middle West and the East? And, as a whole, can we not agree that as a

nation we are moving or beginning to move out of the stage of beef production under an extensive system toward the more intensive form of dairying, and out of the era of high per capita meat consumption? If we are, then history teaches that our people will turn more and more to the consumption of dairy products and as meat becomes more costly, cheese and other dairy products will begin to be used more generally.

Reasoning in this way, the future for dairying looks encouraging and there seems to be no need to worry about having a market for all the dairy products we can produce. The question that puzzles us is "What will be the conditions as to supply and price of labor, price of feed and materials, and what will the market price be?" We may all have our theories about these matters but we are theorizing on a mighty big subject which is influenced by a large number of factors, some of which are as yet unknown. One fact, however, has always been known and has been proved time and again—namely, that the man who has a herd of large and economical production has always been able to make a satisfactory profit, and that the man who guesses at the production of his cows, guesses at the amount of feed he feeds them, guesses at the test of the milk, is apt to wake up some day to the fact that he has guessed himself into trouble.

COW-TESTING ASSOCIATIONS TAKE THE GUESSWORK OUT OF DAIRYING.

There is probably no agency that has done so much to take the guesswork out of dairying as the cooperative cow-testing association. From the one association, started in Newaygo County, Michigan, in 1905, the movement has spread until to-day there are 353 cow-testing associations in 31 states. That is a good beginning, but it is only a beginning. During the past year these associations tested 168,348 cows or about three-fourths of one per cent of all the dairy cows in the United States.

It is probably unnecessary in the State of Vermont to tell about the detail organization of a cooperative cow-testing association, an association of 26 dairy farmers who co-operatively employ a man to test their cows for economical production, further than to say that you have a number of them in your State and that the average number of cows required for an association is about 450, owned in 26 herds, within easy driving distance. Such an association is self-supporting. It employs a man called the "cow tester" who

works with the herds of the 26 farmers, spends 24 hours each month with each, weighing and testing each cow's milk, and recording the feed consumed. The tester keeps these records in a book provided for this purpose, which becomes the property of the member as his permanent record of the economy of production of his herd. This record tells these facts about each of the cows in his herd; total number of pounds of milk produced, fat test, pounds of butterfat, total value of production, amount of roughage and grain consumed by the cow and the cost of them, the income over feed cost and returns for \$1.00 expended in feed.

With this record the man is enabled to take the guess-work out of dairying. It lets in the daylight. Each cow is made to stand or fall by her own merits. She is, as it were, on trial for her life, for what dairyman can afford to board a cow that does not pay him market price for her feed, and a fair profit besides? In this trial, the cow tester is the prosecuting attorney or the counsel for the defense, as the case may be. The Babcock test and the scales are the chief witnesses. They furnish the evidence, and the farmer judges the cow—condemns or acquits her—according to the evidence presented, seeing always that both sides have been fairly presented.

THE COST.

The cost of such an association is \$1.50 to \$2.00 per cow for a year; this fee going toward the cow tester's salary. In addition, each man is supposed to convey the cow tester to his next place of work.

THE NEED FOR SUCH ASSOCIATIONS.

The most common objection we meet when we try to convince a man that he should become a member of the cow-testing association is that he knows which are his best cows and he knows his poorest. We have compiled considerable data on this point, and are able to say that this is true only in a very small percentage of cases. Usually in the majority of the cases we find that the cows he thought were the best were far from being so, and that the cows which he thought were his poorest were actually some of his best in economic production. There are so many things to lead judgment astray. Governor Hoard used to say that the inside of a cow is the darkest place on earth; we cannot tell by her looks whether she will produce butterfat at a

feed cost of 15 cents or 25 cents, and that may make the difference between profit and loss. Many a cow has had the conformation, which in our erring human judgment would make her a profitable producer, and has failed to make good. Some cows give a wonderful flow of milk when they are fresh, but go dry too early. We get the impression that she is a very good cow, for we remember the great flow of milk she gave when she was fresh, and forget the long time she was dry. On the other hand, some cows only give a moderate flow of milk, but milk practically the year around, and in the long run she may prove far the most profitable cow.

It is a fact that in a large percentage of cases in each association we hear this statement made by the farmer; "The cow I thought was my poorest has turned out to be one of my best."

Strange to say, we find whole herds which are unprofitable without the owner having a realization of this fact. As an example I might mention a case in Virginia of a dairyman who owned 91 cows, and who was buying his neighbors' milk and manufacturing it into butter and cream for shipment to Washington. A year's work in the association established that his herd of 91 cows averaged only 3,311 pounds of milk per cow, 158 pounds of butterfat, and returned him an income over cost of feed of 64 cents per cow in a year. Three and a half miles away was another member of the association who owned 16 cows, producing an average of 6,817 pounds of milk, 306 pounds of butterfat, and returned an average income over cost of feed of \$74.92 per cow. The average cow in this herd produced more income over cost of feed than all the 91 cows in the other herd; in fact, it would have required 117 cows to produce as much income over cost of feed as one of the cows in the 16 cow herd.

From Wisconsin we have the following example:—

	(A)	(B)
Number of cows,	11	11
Breeding of cows,	2 purebred	1 native
	9 grade	\$814.21
Feed cost,	\$526.70	10 grade
Average fat production,	171.1 lbs.	\$569.96
Income over cost of feed per herd,	\$ 95.73	386.9 lbs.

It would have taken 93 cows like the average cow in the first herd to equal the 11 cows in the last herd.

One result of the cow-testing-association work is that the "star boarder" is detected and sold to the butcher. In one association of 600 cows in the State of Pennsylvania, 120 cows or 20 per cent were sold to the butcher last year. In the State of Wisconsin last year 1,500 dairymen owning 25,000 cows sold 4,000 of them, or 1 in 6, as unprofitable. The consequence was that they bettered the economic production of their herds. In New Hampshire, 413 cows or 16.9 per cent of the cows in cow-testing associations were sold to the butcher as "boarders." In this day of high cost of labor, it certainly is an advantage to be able to secure the greatest income out of the least expenditure of labor. One man in Illinois owning 27 cows joined a cow-testing association, and at the end of a few months sold 17 of his cows and received \$125.81 greater income over feed cost from the remaining 10 than from the original 27. This example is not unusual at all, but it rather represents the general experience.

INCREASES THE VALUE OF GOOD COWS.

It has been often reported by members of the cow-testing association that the records have enabled them to sell their good cows to better advantage. One man told me the other day of his experience. Two years ago he bought his neighbors' cows from \$65.00 to \$75.00 per head. He then joined the cow-testing association, but found later it was necessary to sell his herd and did so at auction. The average price he received was \$110.00 per cow. Some cows sold as high as \$142.00. He stated the fact that he had the records of his cows and was able to tell what his cows produced made the difference in the sales price.

PROMOTES BETTER BREEDING.

Following are the records of one cow-testing association for four years, which indicates something of the results which may be expected from membership in such an association.

Years	Milk	Fat	Value of product	Cost of feed	Income over feed cost
1913-14	5239	224.4	\$ 71.32	\$ 28.54	\$42.78
1914-15	6063	274.3	85.52	33.49	51.14
1916-17	6230	294.5	112.39	42.00	70.39
1917-18	6180	291.7	141.28	49.77	91.51
Increase	941	67.3	69.96	21.23	48.73

From Wisconsin we have the following example:—

Years	Milk	Fat	Value of product	Cost of feed	Income over feed cost
1st	6096	334.9	\$116.82	\$ 48.12	\$ 68.70
2nd	7429	396.5	131.50	52.37	79.13
3rd	9718	499.9	164.99	62.37	102.62
Gain	3622	165	48.17	14.25	33.92

We have just finished the tabulation of the records of the Newaygo County Cow-Testing Association. As you may know, this is the first association organized in the United States, and needless to say we are all very proud of it and of the work the members have done. The following chart shows in a graphic way the progress made during ten years of operation.

You will note that during the first year the average production per cow was approximately 215 pounds. This was considerably above the average production in the State of Michigan at that time; in fact, I believe I am safe in saying that the average production in the same herds the year before the association was organized was not above 160 pounds of fat. If that is correct, then the average production of the herds owned by the members of the association increased from 160 to 215 pounds in the first year. This is a difficult point on which to get accurate data but my observation leads me to believe that such an increase during the first year's membership in an association is not unusual and is due to the direct influence of the increased interest in the feeding and care of the dairy cow which is a result of membership in a cow-testing association. To this should be added, of course, the fact that a number of cows are detected as unprofitable and disposed of within a few months after testing begins and this has a tendency to show a greater average production for the year.

AID IN FEEDING.

One of the greatest values of the cow-testing association is probably the help it gives the farmer in enabling him to feed the cows according to their production. In a herd of 20 or more cows we usually find the cows are fed more or less alike. The herdsman will tell you, if you ask him, that he feeds the good cows better than the cows that do not give

much milk, but if you examine into the matter you find that he only gives the good cow about 2 pounds of grain more than the others. One result of this sort of feeding is that the good cows do not get sufficient feed to reach the maximum development in milk production, and the cows which do not have it in them to produce a good generous milk flow are fed too much grain; that is, more grain than they can profitably handle. In this way the good cows are not given a fair show, and money is wasted on the poor cows for they consume expensive feed for which they can make no adequate return. The usual result is that in those herds you find the milk production running from 12 to 25 pounds per cow quite uniformly throughout the herd.

The good cow tester induces the farmer to place a card or an ordinary school slate over the stanchion of the cow. On this slate is marked the number of pounds of grain each cow should receive. This is figured from the amount of milk she gives. It is easy for the herdsman as he goes along to look up on this slate and see the number of pounds the cow should have and weigh it out to her. The cow is kept on this grain ration for a couple of days when the milk sheet is again consulted, and if she has gone up on her milk another half pound of grain is added. If she responds to that in milk flow another half pound is added a few days later, and in this way the cow is led or developed up to her maximum capacity. On the other hand, if the cow does not respond to the increased grain ration it is lowered by a half or a whole pound, and if she still continues to give the same flow of milk we take off another half pound a few days later, and so on until she begins to go down in her milk flow, for there we have found her point of economic production. It has been the experience of dairymen that this system of feeding has saved them lots of feed, and enabled them to get a greater production of milk from their cows.

Before the formation of a cow-testing association in one district in Maryland, few farmers fed grain to their dry cows and none fed a balanced ration to any of their cows. When grain was fed, it was dished up with a scoop shovel and all the cows were fed alike regardless of production. In that association some of the cows were underfed and some were overfed and most of them were fed at a loss. The tester was able immediately to place most of the herds on a profit bearing basis. His work in that association is typical of what is being done in many associations in all parts of the country.

STUDY OF RECORDS WILL BRING OUT MANY INTERESTING FACTS.

In the Washington office, we have for the last couple of years made some very extensive tabulations of records from cow-testing associations. We find in these records a good many gold nuggets which are hidden away and which we can not find without making a tabulation of the records of a large number of cows. Up to this time, we have tabulated the yearly records of more than 20,000 cows from all parts of the country. These tabulations are bringing out many interesting results.

The tabulation of the Allegan County (Michigan) records for 1914-15 on the influence of butterfat production showed that the group of cows that produced 157 pounds of butterfat a year had an average income over cost of feed of \$6; while the cows that produced 300 pounds of butterfat a year had an average income over cost of feed of \$26, more than four times as much. The group that produced 456 pounds of butterfat a year had an average income over cost of feed of \$66 or eleven times as much as the group whose average yearly production was 157 pounds. In other words, as production doubled the income over cost of feed increased four times, and as production trebled, the income over cost of feed increased eleven times. Evidently it pays to keep good cows. Ten cows of the higher productive group would yield as much profit as 110 of the lower group. Yet the lower group is composed of average cows. A tabulation of the records of 40 associations from various parts of the country gave very similar results.

A tabulation of the records of ten associations on the influence of date of freshening on income over cost of feed gave December first place, January second, March third, October fourth, September fifth and November sixth. May got tenth place, June eleventh and July twelfth. July got twelfth place, but that was not the lowest. There is another class made up of those whose owners did not know the date of freshening. They were certainly unlucky. They got thirteenth and last place. They were decidedly behind the others, because even the cow that freshened in July had an income over cost of feed of \$59, while those whose owners did not know the date of freshening had an income over cost of feed of only \$44. Evidently the dairymen who do not keep track of their business are the owners of poor cows.

The following figures indicate the influence of present conditions on the dairy production:—

Testing Year	Number of Associations	Butterfat	Value of product	Cost of feed	Income over cost of feed
1912-13	7	219	\$74.55	\$31.52	\$ 43.03
1913-14	9	251	81.88	41.64	40.24
1914-15	13	252	89.03	43.75	45.28
1915-16	32	260	97.52	48.46	49.06
1916-17	8	240	102.91	50.91	52.00
1917-18	5	241	138.82	65.40	73.42
Total	74				

The number of associations considered may not be great enough to warrant positive conclusions but the records of 74 distributed quite generally over the Central and Eastern States should be enough to indicate what a larger tabulation may prove. These figures show an increase in the cost of feed throughout the whole period. As production also increased during the first four years the increased cost of feed during that period may have been partly due to better feeding, but it was probably due more largely to the advancing price of feeds. For the last two years, the cost of feed went up rapidly while production per cow decreased. Evidently the decrease in yield of butterfat came from the cutting down of the quantity or quality of the feeds used, because most of these associations represented were situated in very good dairy districts. It is interesting to note that there was a falling off in the income over cost of feed from the first to the second year, and a constant rise after that time. This rapid rise for the last year seems to be due in part to better prices.

These are only a few of the facts brought out by a study of the cow-testing association records. These records are a gold mine of useful information. We are now tabulating the records in the study of more than 20 different topics. The following are some of the topics that have already received some attention.

1. Influence of Breed on Production and Profit.
2. Influence of Age on Production and Profit.
3. Influence of Production on Profit.
4. Production and Profit as Influenced by Fat Test.
5. Production and Profit as Influenced by Date of Freshening.
6. Influence of Size within the Breed.
7. Effect of Location. Effect of Pasture.

8. Daughters of purebred bulls compared with their dams.
9. High Grain Rations vs. Low Grain Rations.
10. Breeds Compared. Grades vs. Purebred.
11. Dry Ration vs. Silage Ration.
12. Alfalfa and Silage vs. Silage, Hay and Grain.
13. Economy of Production.
14. Large cows vs. Small cows.

The average dairy cow of the United States produces only 160 pounds of butterfat and about 4,000 pounds of milk a year, while the average production of 22,000 cow-testing association cows was 249 pounds of butterfat and almost 6,000 pounds of milk a year. These results may not all be due to association work, but they are certainly partly due to association work. Evidently it pays to keep good cows and to feed them well.

It pays and pays well to belong to a cow-testing association. In most cases the small cost is returned many fold. Probably no one investment that a dairyman can make pays better except an investment in a well organized and properly managed bull association.

BULL ASSOCIATIONS NECESSARY.

Being connected with the Department of Agriculture, it is natural that I should have gotten into the habit of viewing our dairy industry from the national viewpoint. Statistics show that we have in the United States 23,000,000 dairy cows or cows kept for milk that are owned on something over 5,000,000 farms. Dividing five into twenty-three, we find that the average herd consists of approximately five cows.

I also made a little calculation some time ago in an endeavor to determine what was the field for cow-testing associations; that is, how many cows we can hope eventually to reach through that medium. We must have twelve cows in a herd before the owner can join a cow-testing association, and I have calculated that out of the 23,000,000 cows in this country, only 5,000,000 are owned in herds of 12 cows and over. The remaining 18,000,000 cows are owned in small herds; that is, ten cows or less. These 18,000,000 cows produce the great bulk of our dairy products and if we hope eventually to get the dairy business upon a higher level of production, to make it more profitable, we must find some means of enabling the owners of these 18,000,000 cows to improve the quality of their dairy

stock. The man with less than ten cows is usually not a commercial dairyman, for he does not have enough invested in cows to give the business the care and attention it requires to make a success of it. It is difficult to interest such a man in building up his herd through the ownership of a meritorious purebred bull. If he has ever considered the question of buying a good bull for the use of his herd, he has come to the conclusion long ago that it would cost him too much. Even if he owns ten cows, can we advocate that he should go ahead and buy a good purebred bull?

A bull good enough to improve his stock will cost him not less than \$200. I think I am right in saying that, if the bull is to be good enough to improve his herd. He keeps that bull two years, when he must dispose of it to avoid inbreeding. That means that his bull service costs him \$100 per year. Of course, it costs something to feed that bull those two years but that may be offset by the bull's beef value when he is sold. You may say that the bull should not be killed for beef if he has good dairy qualities and that is true. The man with a small herd of grade cows, however, does not have the facilities for selling a good purebred bull and in nine cases out of ten he will be sold for beef. If that is true, then it costs this man with a small herd of ten cows \$100 a year for bull service. That amounts to \$10 per cow, and as only half the calves can be counted on as being heifer calves, the cost of bull service per heifer calf is \$20, and that, I think you will agree, is prohibitive for grade stock.

The consequence is that the little fellow with from four to eight or ten cows has realized long ago that he can not own a good purebred bull but must breed his cows to his neighbor's bull. This year he may breed his cows to a bull owned by a neighbor keeping Holstein stock. The next year a Shorthorn bull is more convenient. The next year a bull of some other breed is used, etc. The consequence is that he makes no progress in developing his herd, either from the standpoint of increased production or that of more economical production.

It seems to me that if we hope eventually to build up a good strong dairy business we must find some way of helping the little fellow who produces the larger part of our dairy products in building up his herd.

WHAT IS A BULL ASSOCIATION?

Fortunately, in the State of Michigan was originated a plan for doing that very thing, and it is called the co-

operative bull association. A certain number of farmers owning either 180 or 240 cows club together and agree upon following the same line of breeding, dispose of any scrub bulls they may have and subscribe funds for the purpose of securing three or four meritorious purebred bulls of the same breed. The territory covered by these 240 cows is divided into four breeding blocks with about 60 cows in each block, and a bull is located in each block, as nearly as possible in the center of the block. He remains there for the service of the cows in the block for two years. When the bull in block number 1 is changed to block number 2, the bull in block number 2 is changed to block number 3, etc. At the end of two years more, the bulls are again rotated and in this way they have the services of good purebred bulls for eight years for their share of the initial cost of one good bull. This makes it possible to use the bulls for the entire period of their usefulness and it makes it possible to get a line on the value of each bull, for no matter how good your selection of bulls may be, there will be some bulls that do not measure up to their ancestry. At the end of two or three years you will know what kind of heifers a bull gets. If his heifers are better than their dams, the bull may be kept. If, on the other hand, he does not improve the stock, he may be disposed of before he has time to do any more harm.

RESULTS IN A BULL ASSOCIATION IN MARYLAND.

I have here a report from Carroll County, Maryland, for the year 1916-17. Of the 17 daughters of association bulls, 16 excelled their dams in butterfat production. On an average the daughters produced 1,144 pounds more milk and 63 pounds, or 26.7 per cent, more butterfat than their dams.

The average production of the daughters for the year was 6,919 pounds of milk and 301 pounds of butterfat. The record of the highest producing daughter was 410 pounds of butterfat, which was 209 above the record of her dam. Yet the record of the dam was 41 pounds above the estimated average production of all the dairy cows in the United States.

Now if these 16 daughters will continue to produce for six years, each of them will produce 6,864 pounds of milk and 378 pounds of butterfat more than their dams in the same length of time, or a total of 109,824 pounds of milk and 6,048 pounds of butterfat more than their sixteen dams. That is based on the assumption that these heifers

will be productive for six years. This is just one year's work.

RESULTS OF A SCRUB BULL.

As a contrast, the following figures from another district show the evil results that come from using a scrub bull. The dam produced 146.8 pounds of butterfat; the daughter, sired by the scrub bull, produced 126.3, and the granddaughter, sired by the same bull, produced 99.7 pounds of butterfat.

WHAT DOES A BULL ASSOCIATION COST?

The cooperative bull association brings the cost of good purebred bulls within the easy reach of the average owner of dairy cattle; in fact, the cost is usually much less than the former investment in scrub bulls. The bull association is especially adapted to those districts where the herds are too small to warrant the private ownership of first-class registered bulls.

Out in the State of Iowa, there were 13 men who owned 9 bulls. One of these bulls was purebred; the rest were grades, scrubs and beef bulls. These men, who were located around the little thriving town of Roland, organized a bull association. The nine bulls were sold at an average price of \$89 per head and replaced by 5 purebred Holstein bulls, at an average cost of \$240 per head. So you can see it did not cost them another dollar to replace their scrub bulls with meritorious purebred bulls. Each man, under the old arrangement, had \$89 invested in a bull for two or three years and a poor bull at that. Under the new arrangement, he has an investment of only \$7.50 per year for bull service. When the association was organized, the herds belonging to the members were a badly mixed lot. Now the herds contain a number of purebred animals and a great many good first-class grades.

DO BULL ASSOCIATIONS SPREAD INFECTIOUS ABORTION?

You may say, and I have no doubt it has occurred to you already, that this breeding of a number of herds to the same bull may become dangerous; that it may spread infectious abortion. That fear has been one which has retarded the bull association work more than any other one thing. We find, however, that bull associations are a potent means of fighting infectious abortion. There is a

little streak of human nature in this. Isn't the usual experience as follows: We have a herd of 20 or 30 cows and one day one of our cows calves prematurely. We think very little of it except to say that it is too bad and that the cow must have been hurt in some way. Some days later, perhaps, two or three of our cows drop their calves prematurely, and we begin to look around for something about the management of the herd which may have caused injury to the cows, and it is not until infectious abortion has gotten a good hold on the herd that we wake up to the fact that it is, in truth, infectious abortion. Then what do we do? Why, a good many of us keep still about it, and the neighbors do not hear of it.

In a bull association, every member is on the alert and is watching his neighbors' herds. Records of calving are kept and nine chances to one it will be known if a neighbor gets infectious abortion in his herd. The fact is that we find that members of bull associations do not have any appreciable trouble with infectious abortion for it is to each member's interest to see that the herds are kept free from that disease. This is illustrated by an outbreak of infectious abortion in two herds in the Iowa association. As soon as the outbreak occurred the officers of the association got in touch with the college, called a meeting and had all the members hear what the man from the college had to say. Prompt measures were taken and the outbreak was soon under control. This incident shows that the bull association would tend to make the outbreak of disease a community problem to be dealt with by the community rather than by the individual. Before the association at Roland was organized only two members tested their herds for tuberculosis; now all 13 have had their herds tested and all the herds will soon be made accredited.

A BULL ASSOCIATION IN NORTHERN WISCONSIN.

In the cutover district of northern Wisconsin, the farmers were unable to own purebred bulls individually. Sixty men were induced to join a bull association. These sixty men owned only 120 cows but without the bull association they would not have been able to improve the progeny of these cows, and this is another case of where the bull association makes it possible for the little fellow to increase the value of his stock.

BULL ASSOCIATIONS IN THE SOUTH.

We have not been used to thinking of South Carolina as a dairy State, but it organized last year more bull associations than there are in any other State in the Union. South Carolina has only 180,000 dairy cows, while Michigan has 767,000; yet South Carolina now has nine dairy bull associations as against seven in your State.

In Lee County, South Carolina, a certain group of farmers clubbed together, formed a bull association and bought five bulls. At the time the association was organized none of them had purebred cows but now they have 352 cows in the association and 116 of them are purebred. That is one of the curious results of association work. The members may have ordinary scrub cows when they start in but when they realize how good the bull is they begin to become interested in better cows and realize that their cows are not good enough to breed to a good bull. When the association was organized very few of them had barns and silos. Elaborate barns are not needed in that climate because of its mildness but now nine of them have good substantial barns with silos. They have a modern milk plant and milk is being shipped in insulated cans to the large cities and is of a much higher grade than the milk from other nearby localities. This is the result of one year's work in a bull association in a territory where they had practically no dairying before.

In another association, 7 good purebred bulls replaced 42 scrubs; one purebred bull cost \$231; replacing six scrub bulls costing \$300.

Now, I think that if we are going to get ahead very far in the building up of a more constructive dairy industry based upon a good substantial and broad basis, we must take into account the owners of the 18,000,000 cows, the little fellows with five, six or seven cows, who, after all, constitute the average of our creamery patrons and cheese factory patrons, and produce the great bulk of our dairy products. We have in the bull association a means for enabling these men to build up their herds, to get a greater income year after year from better stock, and to make every year of their life worth twice as much as it is now worth by building up the production income of their herds, and I believe the Vermont State Dairymen's Association could well afford to give its most hearty support to this movement which has for its purpose that of helping the small dairyman.

I do not know just what you can do as an association; I will leave that with you to decide, but I think you can well afford to give serious attention to any means by which you can help the bull association movement in a broad constructive way.

I thank you for your kind attention.

LOOKING FORWARD IN COW TEST WORK.

RALPH P. HOTIS, SCIENTIFIC ASSISTANT IN DAIRYING.

A year ago today we were assembled here to discuss this same question, but under much different conditions. During the past year more world history has been made than you or I will ever again see crowded into the same length of time. A year ago you, as dairymen, were admonished to produce, produce, and produce to the utmost, some even advocating production regardless of cost to-day we are facing a much different situation. We are entering the period of reconstruction, not alone in industrial lines, but in agriculture as well. A period in which Cow Test Associations will have to play a most active part because from now on we must change our slogan from "production" to "greater average production" and in order to obtain this we must use the test association more liberally.

I suppose some of you are already asking, "Do we need the Test Association?" Let me ask you another question. "Do you need food?" I am thoroughly convinced that the Test Association is as necessary to the dairy industry as food is to the human body. I dare say there are hundreds, yes thousands of cattle in this state with a production of 2,000 pounds per year. I am afraid some of the dairymen are like the old man who had about 8,000 acres of worthless land, most of it being swamps and rocks. He was approached one day by a friend and asked why he didn't sell for whatever he could get and put his money where it would bring some return. Well, "he said," You know there is considerable satisfaction in knowing that you have that much land," and it looks as though some of the dairymen found satisfaction in having their stable full of cows, even though they are the 2,000 pound kind.

During the past year the number of Test Associations in Vermont have decreased from 46 to 12. This has been caused by various things. Some associations have been unable to find men, while others have thought it unnecessary to continue the work under war conditions. Most of these conditions are rapidly passing and it is high time for us to make an effort to get back our former numbers.

There has been a rumor current for the past two years that the number of dairy animals were rapidly decreasing. True a large number have been sold but they have been, for the most part, the aged, infirm, or crippled. You dairy-men know that the past year has been a very advantageous one for selling this class of stock, because if the stock was in fair condition they brought as much as good cows five years ago. I was interested to learn a few days ago that there are 4,000 more dairy cows in this state at present than a year ago. So I feel there should be little worry in that direction.

However, as time passes, there is more and more a desire on the part of buyers to know the records of cows. Not alone the record for one year, but the record over a period of years. I have seen several cows sold during the past year, not on their looks, but because of the records behind them. I have seen buyers pay from \$20 to \$25, yes \$30 above their market value simply because they had the records. The time is coming, and not far distant, when dairy animals will have to have a record and will have to be tuberculin tested before they can command the best market value.

Before entering upon the work for the new period, let us see what suggestions we can find for the reconstruction of the Test Associations. Very few new methods have been adopted since the formative period. Some associations have adopted the plan of figuring their product for what it is bringing each farmer, rather than figure all the herds on the basis of fat, no matter whether they were selling butter fat or whole milk, and I believe this has given extremely good satisfaction. Let us examine, then, with a critical eye to see what changes we can make that will make the Test Association more practical.

One of the first things that meet your eye upon examining the test book is the pasture charge. Ever since test associations were formed in this state, it has been the practice to charge up the pasture at \$1 per head per month. This has been done no matter whether Mr. A pastured 20 cows on 20 acres and Mr. B. 20 cows on 40 acres of equally valuable land. Then too, you all know that June pasture is much superior to October, yet, you allow it to be charged at the same rate in your books. Here is one chance for the State Department to help. I believe it is possible to arrange a scale of points so as to enable the tester to apportion each cooperator's pasture charge according to what he really has, and according to the usefulness, meaning the feed, which he derives from it each month.

I have also noticed in looking over the books of the individual members a great variation in the price of roughage raised on the farm, even though it was the same grade and quality. Many make the mistake of charging the feed at market value, or at what the feed would bring delivered at the market, perhaps five miles away, whereas this charge of delivery should be charged to the hay, while the hay fed should be charged to the cows at its value in the barn and not at its value in the market five miles away. This will also hold with home grown grains that are fed with no preparation. However if they are ground a formula as follows could be used. Price in the market where ground + cost of hauling back to the farm + cost of grinding = cost of grain to the cows.

I believe it will be of great advantage to new associations, as well as the old associations, to secure better testers. You all remember when the associations first started the testers were men around thirty years of age and having considerable experience. At that time you were able to hire such men for the fee of \$1 per cow. For the past ten years the buying ability of the dollar has greatly diminished, so in order not to raise your fee per cow, you have constantly lowered your grade of tester until your men of today are around twenty years of age with little experience. Have you ever stopped to analyze what is required in a good tester? In the first place you want a man of some age and experience. You also want a man that knows the feeding problem and can help you in your feeding. He must be quick at figures and accurate in his work. Then too he must be a good mixer. One who is able to come into your family, your neighbor's family, your cooperator's family five miles away, accept the conditions as he finds them, make himself at home, and be agreeable. You also want him to keep a neat book and have that book up to date at all times. These are the main requirements and I think you will readily see they are considerable. If you are able to get this kind of a man, don't begrudge an extra twenty-five or fifty cents per cow, because he will be able to make a better association and, I dare say, bring you a greater return on your investment than you can get in any other way.

After having selected the right tester, make sure to keep your association alive. There are several ways in which this can be done. In the first place you can tell the people what you have, in other words advertise, advertise, and then advertise some more. Get in touch with your local paper and have a good newsy article printed each

month telling about the work your association is doing. There is also a possibility of holding meetings each month at the home of the cooperators, discussing at such meetings feeding problems, breeding problems, and other things of interest.

Let me take a specific illustration to show how one association is alive to its opportunities. Situated in the Champlain Valley of Vermont, in Addison County is the First Champlain Valley Cow Test Association, organized about five years ago and showing steady progress from the first. Some time ago I thought it would be a good plan to offer a prize for the best cow for milk, and the best cow for fat over a period of three years, scored according to a scale of points given later. The matter was taken up with the National Bank of Vergennes, they thought well of the plan, and offered to donate two cups for the competition. The cows winning the cups at the end of the first year are to receive them to retain them until the end of the second year, when they are to pass to the cows having the most points for the two years, and at the end of the third year they are to pass for permanent ownership to the cows having the best scale of points for the three years. The scale of points by which the milk cow is to be judged is as follows:—

Allow 100 points for the first 6,000 pounds of milk.

Allow 25 points for each 1,000 pounds of milk over the 6,000 pounds.

Allow 4 points for each 100 pounds of grain fed under the rule.

Deduct 4 points for each 100 pounds of grain fed over the rule.

Allow 1 point for each 100 pounds of hay fed under the rule.

Deduct 1 point for each 100 pounds of hay fed over the rule.

Allow 1 point for each 250 pounds of silage fed under the rule.

Deduct 1 point for each 250 pounds of silage fed over the rule.

The scale of points by which the cow giving the most fat is to be scored is as follows:—

Allow 100 points for the cow giving 240 pounds of fat.

Allow 13 points for each 20 pounds of fat above the 240 pounds.

Allow 4 points for each 100 pounds of grain fed under the rule.

Deduct 4 points for each 100 pounds of grain fed over the rule.

Allow 1 point for each 100 pounds of hay fed under the rule.

Deduct 1 point for each 100 pounds of hay fed over the rule.

Allow 1 point for each 250 pounds of silage fed under the rule.

Deduct 1 point for each 250 pounds of silage fed over the rule.

You will ask why I selected the 6,000 pound cow as my standard. This was done for two reasons. In the first place most authorities tell us that the cow must give from 5,000 to 6,000 pounds of milk before a profit is really assured. Then too I believe this is the lowest mark which we should strive to reach in building up our dairies. My authority for adding the 25 points for each 1,000 pounds over the 6,000 pounds is found in bulletin number 357 published at Cornell in which the following statement appears. "The profit from cows yielding 10,000 pounds of milk a year was 51% greater than from those yielding 6,000 pounds." In other words if the first 6,000 pounds of milk is equal to 16 points per 1,000 pounds, each 1,000 pounds above should be scored at 50% more, or 25 points, and I feel you will readily agree with me that the cow having the ability to produce 10,000 pounds of milk should be scored double the points given the 6,000 pound cow. The points given and deducted for feed are scaled according to the price they bear to each other. For example, if hay is worth \$12 per ton, grain can be bought for about \$50 per ton, and if silage is valued at \$4 per ton, hay can be bought at from \$10 to \$12 per ton.

The scale of points for the cow giving the most fat is based upon the same principles as the scale of points for the milk cow.

As you have already noticed each table refers to a rule for the amount of feed fed. After examining several formulae put out by various investigators, I decided that the one put out by the United States Department of Agriculture from their work in Indiana would answer better than any other, because of the fact that the year was divided into the two periods of winter and summer. From this

data the amount of feed required for each 100 pounds of milk is as follows:—

WINTER, 6 MONTHS.		SUMMER 6 MONTHS.	
Grain	37.9 pounds		19.5 pounds
Hay	68.7 pounds		26.5 pounds
Silage	147.2 pounds		60.8 pounds

In figuring the rule for fat the average test (3.7%) for the two years' work was used to find the total fat and this amount was used for determining the rule referred to under the scoring for the cow giving the most fat. The amount of feed required for each 10 pounds of fat was found to be as follows:—

WINTER 6 MONTHS.		SUMMER 6 MONTHS.	
Grain	102.5 pounds		52.6 pounds
Hay	185.6 pounds		71.6 pounds
Silage	397.9 pounds		164.2 pounds

Let us tarry a moment to see what merits the above plan has to offer to the Test Association. In the first place it will tend to keep the Champlain Valley Association before the people, as it gives them an advertising medium, which, I believe, no other association has adopted. It will have a tendency to create more enthusiasm and interest among the members, because as one writer says, "Right or wrong, man works for reward." The interest and enthusiasm will help keep the association together, and by having more interest the dairymen will study their books more carefully and thereby keep the tester at his highest efficiency. Then it shows the dairyman the value of the test over a period of years, because the cow making the big record for one year is not always the most valuable, as she may have freshened during the first month of the year and milk the entire year without a dry period, thereby making an exceptional record, yet her record for a period of years might not be much above the average of the herd.

I have tried to point out to you some of the things to look forward to in test association work, as we enter the new period of reconstruction. If any of the suggestions will lead to the securing of better testers, or to the establishment of new associations, or to the betterment of present associations, I will feel that the dairy industry will have taken a step in advance in the Green Mountain State.

RESOLUTIONS.

The Vermont Dairymen's Association and the Vermont Sugar Makers' Association in joint convention assembled, thank hotel managements, press reporters, speakers, exhibitors, citizens of Burlington, everybody who has helped make this meeting a success. Especially do they thank Mr. E. E. McGaffey, the general agent of the Worcester Salt Company, whose product never loses its savor, for the delightful entertainment furnished on Wednesday evening.

We rejoice that war drums throb no longer, that battle flags are furled. We thrill with pride as we remember Chateau Thierry, St. Mihiel, Sedan and the Argonne. We look to Versailles for the consummation of a lasting peace.

We stress the food values of milk and milk products. We realize that they are in a class by themselves among foods and want consumers also to realize the fact. We believe in advertising our wares. We favor organized educational campaigns which shall set forth their intrinsic merits. We applaud the efforts of New England and New York producers' associations to this end.

We feel that the producer of milk is entitled to a price which shall repay him for his outlay and return him a fair profit on his investment. Consequently we array ourselves squarely on the side of any and all dairymen who, singly or collectively, strive to that end. We believe that in a world where organization appears to be the watchword, farmers must, should and will band together; and to every such movement we wish wise guidance and long life.

We believe that the farm bureaus, maintained conjointly by the Federal Department of Agriculture, the College of Agriculture of the University of Vermont and the farmers of the several counties, have proven their worth; that the expansion of the system to include the employment of a home demonstration agent and of a boys' and girls' club leader in each county is desirable; that the continuance of the appropriation of a portion of the so-called emergency federal funds for the purpose would be welcome; that an increased state appropriation to the same end is urgently needed; and we instruct the incoming secretary to forward a copy of this statement to our Senators and Representatives in Congress and to the Chairman of

the House and Senate Committees on Agriculture of the Vermont Legislature.

Chas M. Winslow of Brandon, for nearly a generation Secretary of the Ayrshire Breeders' Association of America, formerly Secretary of the State Board of Agriculture, a longtime and faithful attendant and frequent speaker at our meetings, died last summer. He was an ardent believer in the merits of the red and white cow, a good farmer, a successful breeder, a noted judge of dairy stock, widely known and universally respected among dairymen throughout the land. To him, more than to any other one man, is to be attributed the present satisfactory status of the Ayrshire cow among the purebreds of the country. A charming gentleman, a genial companion, has gone to his reward.

A little less than two months ago, the great apostle of American dairying, full of years and honor, died at his home in Fort Atkinson, Wisconsin.

William Dempster Hoard, son of New York, adopted citizen of Wisconsin, pioneer in more ways than can be named in the upbuilding of modern dairying, farmer, breeder, editor, publisher, public speaker, statesman, Governor, he undoubtedly outranked in his day any other living man in his influence for good along dairy husbandry lines. Hoard's Dairyman for 40 years has been a weekly visitor in tens of thousands of American farm homes. Its program has always been constructive, its face towards the sunrise, and its founder lived to see it perhaps the greatest single factor for good in printed form in connection with American dairying.

The older generation of our members remember him at our meetings. They recollect his homely wit, his pithy sayings, his forceful utterances, his thoughtful argument. He came to us often and his heart was with us in the years when the weak flesh restrained the willing spirit. It is especially fitting that a memorial statue of Wisconsin's dairyman Governor is to be erected with funds contributed by dairymen the land over on the campus of the College of Agriculture of the University of Wisconsin. Surely his works do follow him.

J. L. HILLS,
F. W. DRAPER,
H. K. BROOKS.

The report of the Resolution Committee was accepted and adopted by a vote of the convention.

ELECTION OF OFFICERS.

The election of officers resulted as follows:—

President,	F. H. BICKFORD,	Bradford.
Vice-Presidents,	S. L. HARRIS,	Proctor.
	C. C. GATES,	North Hartland.
Secretary,	O. L. MARTIN,	Plainfield.
Treasurer,	M. A. ADAMS,	Derby.
Auditor,	F. L. DAVIS,	Hartford.

FINAL ADJOURNMENT.

THE BANQUET.

With the adjournment, at 1.00 o'clock Friday morning, of the Annual Banquet of the Vermont Dairymen's Association at the Hotel Vermont one of the most successful meetings of the Association ever held came to a close. The attendance was such that the management found it difficult to secure seating capacity.

The menu was good, the speaking excellent and the spirit of good fellowship tended to add to the enjoyment of the occasion.

The witty sallies and really good stories of the Toast Master, Hon. Frank L. Fish of Vergennes, kept everybody happy. Judge Fish presides as Toast Master when Congressman Greene can't be present and in the opinion of the banqueters the Judge made good, indeed, as usual.

Fred H. Bickford, the genial and capable president of the Dairymen's Association presided and grace was offered by Dean Hills.

The Van Ness Orchestra played and Frank H. Brooks of St. Johnsbury led the chorus, composed of the banqueters, in singing patriotic airs.

Governor Clement, who made his first appearance in public before a Burlington audience since taking office, made a favorable impression. He was enthusiastically received. The Governor gave a toast to Vermont, emphasizing the sturdy and hardy quality of her people which, in

his opinion, was due largely to the hardships and reliance necessary for an existence of the settlers of the state.

Frank H. Brooks, Vermont's member of the Federal Food Administration, of St. Johnsbury, told of how Vermont helped save the world by the sacrifice of food when necessary and said that the State was one of the leaders in this and should feel proud of the fact that she measured up to the mark. The speaker paid a glowing tribute to Mr. Hoover and pleaded for a continuance of the same kind of spirit of saving and sacrifice manifested during the closing year of the war.

Major James S. Haggarty of the 102nd Regiment, 26th Division, gave a stirring account of his experiences in the service, detailing how his troops went "over the top" and through a strenuous campaign in the sectors where some of the hardest fighting of the war went on.

Captain Harold R. Sheldon of Fair Haven, the first Vermont officer to return from France, representing the National Guard, was introduced but on account of the lateness of the hour did not speak.

Dean Hills who was scheduled for an address, relating his experiences as a member of the Dairymen's Association for 30 years, excused himself also on account of the late hour.

At the rear of the speaker's table hung the National Emblems of France, England and the United States. As an appropriate closing of the banquet and the Association meeting the toast master recited the American Creed.

"I believe in the United States of America as a government of the people, by the people, for the people, whose just powers are derived from the consent of the governed; a democracy in a republic; a sovereign nation of many sovereign States; a perfect Union, one and inseparable, established upon those principles of freedom, equality, justice, and humanity for which American patriots sacrificed their lives and fortunes.

I therefore believe it is my duty to my country to love it; to support its Constitution; to obey its laws; to respect its flag, and to defend it against all enemies."

THE WOMAN'S AUXILIARY.

A large number of women attended the meeting of the Dairymen's Wives and Daughters at the roof garden of Hotel Vermont January 15, 1919 and listened to words of welcome by the president, Mrs. Luella S. Bickford, who said in part: "Our activities during the period of the War have kept us strong and have taught us many things that should make us better women.

"We are justly proud of the tasks our boys have performed and of their deeds of almost superhuman valor on land and sea and in the air.

"Now that the Armistice is signed, we are inclined to feel that our work is done, but this is not true. America never faced such grave problems as she faces today and she needs the co-operation of all her women to solve them."

Mrs. Bickford closed her very timely remarks by leaving as a watchword for the coming year the word "Service". With that watchword ever before them, the women of the auxiliary cannot fail to do their utmost in the great work of Reconstruction.

Miss Fannie Martin of Plainfield gave a reading entitled: "On Christmas Day in the Morning", which was well rendered and much appreciated.

Mrs. Mary I. Wood of Portsmouth, N. H., Chairman of the Woman's Committee of the Council of National Defense, brought a most inspiring message. She said "In all wars, women have been called upon to do acts of mercy, but in no war in history, has woman been called upon to work shoulder to shoulder with men, as she has in this war, and her work has been recognized the world over."

"Four things must be recognized during the period of reconstruction. They are Food, Americanization, Child Welfare and Thrift."

"It should be no effort for us to save food for the people of Europe for we are quite in the habit of saving it to win the War and to help feed the boys in France.

In speaking of Americanization Mrs. Wood said: "America is twenty-five years behind time in her ideas of Americanization". "We welcome people to come and live with us and when they arrive, we do nothing to make them happy or to make them feel that they are American Citizens as well as we."

She spoke of Child Welfare as being more important than anything else, to the women of this country. For the taking care of children is woman's own province and if seven out of every hundred children in this country die, then there is something wrong with our methods. She said: "We must convince the women that they should study their children and make the job of taking care of them such an efficient one, that they cannot help but be healthy in mind and body".

Mrs. Wood touched briefly on the subject of Thrift and from now on, it will be a sin to throw away anything that can be used.

In closing a very helpful talk, she said. "In order to do our part, we should be enthusiastic about our work and get some one else interested in the same sort of thing."

The Van Ness Orchestra furnished music for what proved to be a very enjoyable and helpful afternoon.

Respectfully submitted,

MRS. H. M. FARNHAM,
Secretary.

THE EXHIBITS.

Among the exhibits and those who are in charge of them are the following:—

The Leader Evaporator Company, Burlington, sugar-makers' equipment, C. F. Purinton manager and W. E. Burt president.

G. H. Soule & Co., St. Albans, sugarmakers' equipment, G. H. Soule and F. T. Bradish.

The Lightning Evaporator Company, Small Brothers, Richford, sugarmakers' equipment, R. McElroy and Edward Corliss.

Vermont Evaporator Company, Rutland, sugarmakers' equipment, R. H. Marooney.

The G. G. Grimm Company, Rutland, sugarmakers' equipment, G. C. Cobb manager, R. C. Holman and M. J. Elliott.

The Park & Pollard Company, Boston, grains and poultry feeds, Gregory Grain company.

The Champlain Seed Company, Burlington, Dent variety seed corn and local grown Sanford corn, C. B. Mosher.

The Universal Natural Milker, Columbus, Ohio, automatic milkers, J. F. Murphy and J. F. Conant.

The Richardson Manufacturing Company, Worcester, Mass., farm machinery, T. C. Carpenter.

The Manning Manufacturing Company, Rutland, creamery equipment and dairy supplies, J. E. Kendall.

"B-K" dairy sterilizers, manufactured at General Laboratories, Madison, Wis., C. W. Wentworth, Eastern district manager.

Guernsey Breeders' Association of Vermont. Exhibit contains pictures of prize-winning cows and their records and samples of natural color milk and butter from Apple-tree Point Farms, U. A. Woodbury, 2nd, and Fairview Farms, Col. Foote. U. A. Woodbury, 2nd is in charge.

"Wyandotte" dairy cleanser and sterilizers. The J. B. Ford Co., Wyandotte, Michigan, George B. McVicar.

"Germ-X", germ destroyer and sterilizer and "Wool-fat" salve for horses and cattle exhibited by the North Star Chemical Works, Lawrence, Mass., F. H. Shumway of Boston and J. Loring Lucas of Springfield, Mass.

Western Electric Company, showing new direct connection power and lighting plant, especially for farms and rural districts, developing three horse power, R. P. Foote, New York and W. H. Storer, Boston.

Empire Automatic Milker and Separator, D. C. Slater, Essex Junction.

Wright-Ziegler Company, Boston, Mass., showing Burrell Milkers, James barn equipment and general dairy equipment, C. V. Richards.

S. B. Church & Company, showing air-cooled engines, C. E. Searles, State Manager.

"Napanee" silos, the A. E. Counsel & Son, St. Johnsbury, F. S. Dow.

Standard Package Company, exhibiting woodfibre boxes for butter, sugar, etc., Miss Fanny L. Martin.

Vermont Hardware, Burlington, farming tools, tires, oils, etc., E. A. McMartin and C. H. Colburn.

Cadillac Company, showing "Cleveland Tractor", F. E. Patnaude.

International Harvester Company, Ill., showing general farm machinery, J. S. Shaw, D. G. S. Bushnell and P. G. Hill.

Sharples Milker and Cream Separator, J. R. Davis and C. O. Osher.

Star Line Dairy Equipment, George W. Orviss and J. H. Orviss, Essex Junction.

Strong Hardware Company, Burlington, showing Loudon barn equipment and gas engines, Eugene Quinn.

Perfection Milker, shown by H. G. Hawthorne.

Vermont Farm Machinery Company, Bellows Falls, general farming tools, Peter Langwell, manager, F. A. Church, M. J. Bowen, W. C. Smith, H. W. Mitchell, R. E. Cheney and M. J. Baker.

Burlington Rendering Company, showing dairy and poultry feeds and fertilizers, E. G. Clewley.

The Acme Steel Goods Company, showing the MacMurray butter tub hoops, H. L. Dalton.

The Holstein-Friesian Association of America, E. H. Chapman and J. G. Ullery. In this exhibit a picture of Tilly Alcartra of California, world champion cow, is shown. For the first time her record is given to the public. She is six years old and in that six years has made 6,141 pounds of butter and produced 156,776 pounds of milk. In one year she has produced 1023.5 pounds of butter and 26,127 pounds of milk.

The Creamery Package Company of Chicago, showing dairy supplies, H. H. Scott from New York office.

The DeLaval Cream Separator Company, I. F. Hobart and E. M. Gardner of New York.

The Worcester Salt Company, W. H. Buxton and E. W. McGaffey, the latter New England Manager.

The Quaker Oats Company of Boston, showing Schumacher Feed, a dairy ration, and poultry feeds, C. J. Newton, H. D. Marshall and A. Wasmuss.

The Ayrshire Breeders' Association of America, Clyde M. Smith, J. G. Watson, secretary national association, and W. P. Schanck, Avon, N. Y., president national association.

Green Mountain Silos, The Creamery Package Company of Chicago, A. C. Stafford, P. R. Stafford and E. D. Brooks.

The "E-4" milk bottle, the Essex Glass Company, shown by Eugene Curry, general manager for New England.

The G. S. Blodgett Company of Burlington, showing general hardware and home equipment, H. A. Thompson, H. F. Ross and E. L. Bergeron.

The Chapin & Co., dairy feeds, etc., George Stockwell.

The Ubiko Milling Company, Cincinnati, Ohio, showing "Union Grains," represented by J. W. Cullen.

Diamond Crystal Salt Company of St. Clair, Mich., represented by H. A. Thurlow of Boston, eastern sales manager.

Nobel Refining Company, Cleveland, Ohio, lubricating oils of all kinds, A. J. Payne, Burlington representative.

EXTENSION SERVICE BOOTH.

The extension service of the University of Vermont and State Agricultural College had a very interesting display of clearly illustrated facts and figures which should interest every housewife in the State. One of the features was a chart showing the contents of milk which proves that it is a good food for children and adults. Another exhibit that attracted much interest was placed along a long table. In the center was five-eighths of a cup of milk about which was placed representations of various other articles of food. The milk shown represents 100 calories. There are only 100 calories of food value in 20 stalks of asparagus, two egg yolks, one apple, one banana, three peaches, a lamb chop, a spoonful of beans, etc. Miss Bertha A. Holden, home economics specialist, was in charge. Another exhibit of the extension service, showed the amount of food consumed by one dairy cow and the labor done by one man and one horse. A. C. Lewis, farm management demonstration agent, and Professor Ellenberger were in charge.

SUGARMAKERS' EXHIBITS.

Along one side of the lecture hall was the exhibit of the maple sugar makers. There were 17 exhibitors of maple syrup and five exhibitors of maple sugar, besides several exhibitors of cream and cakes, both products of the maple tree. Two competing exhibits for the silver cup for the most meritorious exhibit of sugar and syrup were from the farm of Joseph P. Spear of West Newbury and C. H. Colvin of Rutland.

FORESTRY EXHIBIT GOOD.

In the rear of the lecture hall was an exhibit by the State Forestry Department. It portrayed the various kinds of blight that affect the Vermont forests, showed photographs of the destruction each does and there were pamphlets on how to fight the blights in the farm forests.

HOLSTEIN-FRIESIAN CLUB.

A business meeting of the Holstein-Friesian Club of Vermont was held, at which routine business was transacted. The annual election does not come until next August. President G. F. Gregory of Dummerston was in the chair with A. P. Bigelow of Middlesex, secretary-treasurer, also attending.

JERSEY CATTLE CLUB.

The annual meeting of the Vermont State Jersey Cattle Club was held on the roof garden of the Hotel Vermont, Tuesday evening. The meeting was largely attended by Jersey breeders from all parts of the State and much interest and enthusiasm were shown. Officers for the following year were elected as follows: President, H. M. Lee of Windsor; Vice-President, W. G. Fassett of Enosburg Falls; Secretary, G. U. Tiffany of East Berkshire; Treasurer, Walter Harrington of West Hartford; Directors M. A. Adams of Derby, George Bliss of St. Albans, F. L. Davis of White River Junction, F. H. Bickford of Bradford.

The motion picture, "Hearts and Jerseys," was shown after the business meeting and created much interest.

VERMONT AYRSHIRE CLUB.

I have no notice.

ANNUAL MEMBERS TO THE VERMONT DAIRYMEN'S ASSOCIATION, 1919.

W. E. Smith	No. 44 Newcastle Road, Brighton, Mass.
W. F. Shepard	Graniteville, Vt.
Don H. Belknap	Cavendish, Vt.
Dan McLaughlin	Waitsfield, Vt.
F. B. Howe	Burlington, Vt.
H. H. Wheeler	South Burlington, Vt.
J. Merriam	Malone, N. Y.
E. C. Fitch	East Calais, Vt.
E. H. Frink	Charlotte, Vt.
C. W. Fitch	Montpelier, Vt., (Res. Ea. Montpelier)
H. M. Lee	Windsor, Vt.
A. G. Wright	Vergennes, Vt.
A. D. Billings	Bradford, Vt.
W. H. Buxton	Falmouth Hotel, Portland, Me.
A. L. F. Wassmus	50 Congress St., Boston, Mass.
J. L. Carpenter	Starksboro, Vt.
R. E. Thomas	Winooski, Vt.
J. Loring Lucas	Springfield, Mass., P. O. Box 705
Geo. N. Northrup	Wallingford, Vt.
Scott D. Welch	Barre, Vt.
R. P. Foote	Whipplesville, N. Y.
L. C. Bain	Bristol, Vt.
H. Stover	385 Summer St., Boston, Mass.
Geo. B. McVicar	101 Tremont St., Boston, Mass.
R. O. Mudgett	Essex Junction, Vt.
H. M. Fay	No. Williston, Vt.
J. W. Cullen	618 Tremont Bldg., Boston, Mass.
P. G. Hill	Burlington, Vt.
E. W. Brailey	Essex Center, Vt.
J. L. T. Shaw	Chichester, N. H.
L. S. Robey	Hardwick, Vt.
M. J. Hayes	Granville, N. Y.
A. L. Knight	West Chester, Pa.
W. F. Chapin	Essex Center, Vt.
M. B. Roberts	Rupert, Vt.
M. L. Hubbell	Enosburg Falls, Vt.
G. W. Orvis	Essex Junction, Vt.
C. B. Metcalf	135 No. Willard St., Burlington, Vt.
R. E. Cheney	185 College St., Burlington, Vt.
E. L. Gardner	165 Broadway, New York City

John L. Donnelly.....	Vergennes, Vt.
Ellsworth Sisson	Providence, R. I.
J. E. Carrigan.....224 So. Winooski Ave.,	Burlington, Vt.
A. H. Gilbert.....238 College St.,	Burlington, Vt.
E. A. Darling	East Burke, Vt.
Rowland F. Robinson	Ferrisburg, Vt.
W. A. Vancour	East Hardwick, Vt.
Myron G. Eastman.....	Lyndonville, Vt.
Mrs. Arthur B. Delano.....	East Shoreham, Vt.
F. A. Rist	Wilmington, Vt.
Mrs. Russell Tyson	Brattleboro, Vt.
Mrs. Martin J. Bromley.....	Danby, Vt.
D. A. Blain	Barnet, Vt.
C. M. Story.....	No. Montpelier, Vt.
J. B. Lucia, Jr.	Middlebury, Vt.
L. A. King	East Corinth, Vt.
L. W. English.....	Woodstock, Vt.
E. E. Perley.....	Richford, Vt., R. F. D.
E. E. Shepardson.....	Somerville, Mass.
W. W. Darling.....32 Faneuil Hall,	Boston, Mass.
C. G. Newton.....	Burlington, Vt.
H. D. Marshall.....11 Bellingham Ave.,	Everett, Mass.
W. J. Gardner.....268 State St.,	Boston, Mass.
Geo. W. Stockwell.....	So. Weymouth, Mass.
F. H. Abbott,	
Eastern States Farmers' Exchg.,	Springfield, Mass.
David T. Tranyon.....	Littleton, N. H.
C. V. Richards.....	Hartford, Conn.
E. C. Hayden.....	Montpelier, Vt.
S. G. Scott	Newport, Vt.
C. R. Baldwin	White River Junction, Vt.
N. P. Ladd.....	Richford, Vt., R. F. D.
H. B. Ballou	73 So. Market St., Boston, Mass.
Lee Osgood	Rutland, Vt.
W. C. Conner	Lyndonville, Vt.
The Point Farm.....	St. Albans, Vt.
C. B. Vincent.....	West Hartford, Vt.
Mt. Mansfield Cry.	Stowe, Vt.
W. J. Chamberlin.....	Orange, Vt.
W. R. Swift	Orange, Vt.
L. C. Nelson	Orange, Vt.
G. E. Nelson	Orange, Vt.
A. D. Billings	Bradford, Vt.
P. K. Kingsley.....	Rutland, Vt.
F. H. Shumway.....101 Tremont St.,	Boston, Mass.
E. E. Shepardson.....152 Lowell St.,	Somerville, Mass.
E. L. Gardner.....165 Broadway,	New York.

W. J. Gardner.....	268 State St., Boston, Mass.
H. H. Wheeler	So. Burlington, Vt.
W. E. Smith.....	44 Newcastle Rd. Brighton, Mass.
M. C. Saunders.....	61 Chatham St., Boston, Mass.
Albert Catlin	St. Albans, Vt., R. F. D. No. 1.
Dr. Campbell	Montpelier, Vt.
E. C. Tenney	Dummerston, Vt.
F. B. Howe	Burlington, Vt.
W. C. Connor	Lyndonville, Vt.
W. C. Fuller	Richmond, Vt.
M. J. Wright.....	St. Albans, Vt.
H. M. Lee	Windsor, Vt.
T. J. Orne	St. Albans, Vt.
W. J. Erwin	St. Albans, Vt.
L. W. English	Woodstock, Vt.
N. H. Jewett.....	Williamstown, Vt.
F. A. Rift	Wilmington, Vt.
M. C. Eastman.....	Lyndonville, Vt.
E. A. Darling	East Burke, Vt.
J. B. Lucia Jr.	New Haven Mills, Vt.
L. A. King	East Corinth, Vt.
Eugene Beaudette	Addison, Vt.
W. A. Vancour	E. Hardwick, Vt.
E. A. Dodge	So. Hero, Vt.
Ira H. Belknap & Son.....	Cavendish, Vt.
Mrs. Russell Tyson	Brattleboro, Vt.
Edward Lang	Lawrence, Mass.
H. L. Ruggles	St. Johnsbury, Vt.
H. M. Allen	Burlington, Vt.
C. G. Newton	Burlington, Vt.
S. W. Stockwell	So. Weymouth, Mass.
Harry C. Saytor.....	12 So. Market St., Boston, Mass.
Ellsworth Sisson	Providence, R. I.

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1919.

A

Armo, R. A.....Williston
Alden, B. H.....Orleans
Adams, G. H.....South Barre
Adams, M. A.....Derby
Allen, Charles.....East Berkshire
Allen, H. A.....West Milton
Allen, Henry.....Pawlet
Adams, William H.,
369 Marlboro St., Keene, N. H.
Aseltine, M. L....Springfield, Mass.
Aldrich, E. O.,
R. F. D. No. 2, Clarendon
Allen, G. A.,
R. F. D. No. 2, West Brattleboro
Allen, F. E.,
R. F. D., South Royalton
Ansboro, J. E.....Derby

B

Baker, O. W.....Concord
Bruce, M. K.....Passumpsic
Badger, C. A.....Williamstown
Burnett, R. E.....North Pomfret
Burbank, J. A.....North Pomfret
Burr, L. R.....North Clarendon
Brownell, C. W.....Burlington
Brigham, William O....Bakersfield
Burt, William.....Essex
Burt, Frank.....Enosburg Falls
Blair, N. B.....Morrisville
Bliss, Abner.....Georgia
Beecher, H. A.....Hinesburg
Bates, A. E.....Huntington
Barnum, Ell,
R. F. D. No. 1, Plainfield
Brown, J. S.....Plymouth
Bishop, D. B.....North Williston
Byington, C. M.....Charlotte
Bigelow, A. P.....Middlesex
Burke, J. E.....Burlington
Burnham, W. F.....So. Royalton
Barry, R. A.,
173 Chambers St., New York City
Bliss, D. S.....Middlebury
Beach, H. F....R. F. D., Vergennes
Brooks, H. K.....St. Albans
Brigham, E. S.....St. Albans
Bristol, R. H.....Vergennes
Briggs, E. L.....North Pomfret

Burnett, E. A.,
University, Lincoln, Neb.
Bond, John.....East Montpelier
Blood, W. O.....Norwood, N. Y.
Bass, E. L.....Randolph
Bruce, H. C.....Milford, N. H.
Barry, Leonidas.....Springfield
Brothers, H. F.....Hinesburg
Brackett, W. R.,
9 Chatham St., Boston, Mass.
Bean, G. C.....Coventry
Belden, H. W.....Waitsfield
Bickford, F. H.....Bradford
Buxton, J. E....Middletown Springs
Brock, L. F.....Barnet
Barber, E. L.....North Williston
Bushnell, H. N.....Waitsfield
Burrell, D. H....Little Falls, N. Y.
Bigelow, A. P.....St. Johnsbury
Brewer, J. R.....Hingham, Mass.
Burgham, W. H.....Montpelier
Beach, W. V.....Charlotte
Bent, Orrin,
33 S. Market St., Boston, Mass.
Boutwell, W. C.....Princeton, Me.
Bristol, E. S.....Vergennes
Bellows, F. A.....No. Ferrisburg
Boyden, C. F.....Randolph Center

C

Curtis, H. B.....St. Albans
Conn. Agricultural College,
Storrs, Conn.
Clifford, A. P.....North Pomfret
Cushman, G. L.,
75 S. Market St., Boston, Mass.
Carpenter, E. P....West Waterford
Chaffee, J. H.....West Enosburg
Congdon, Edwin.....Clarendon
Cahee, L. J.....Brandon
Cook, Nelson P.....Mt. Holly
Currier, P. W.....Montpelier
Clarke, M. S.....Clarendon
Clarke, F. H.....Williston
Corliss, N. L.....Swanton
Carter, W. E.....Pittsford
Carrigan, J. D.....Pittsford
Cady, W. N.....Middlebury
Creed, C. A.....Pittsford
Campbell, H. W.....Bethany, Neb.
Chapman, J. H.....West Rutland

Chaffee, Geo. H. Rutland
 Cooke, Geo. S. E. Hardwick
 Crampton, M. S. Rutland
 Chapin, Wm. Middlesex
 Cowdon, H. St. Johnsbury
 Colvin, J. C. West Rutland
 Cunningham, W. F. St. Albans
 Colburn, R. M. Springfield
 Crampton, Charles A. St. Albans
 Cobb, C. H.,

R. F. D., No. 2, Fairfax

Crane, George Brookfield
 Chase, C. P. Proctorsville
 Chandler, G. C. Montpelier
 Chase, Perry East Fairfield
 Carpenter, O. G. Cambridge
 Candon, J. B. Pittsford
 Cloverdale Creamery,

North Underhill

Chamberlin, H. D.,
 McIndoes Falls

Campbell, Archie,

R. F. D., South Ryegate

Curtis, A. C. St. Albans
 Carter, A. C. Rutland
 Clark, Homer F. Charlotte

D

Daley, O. W. White River Jct.
 Donahue, W. C. Monkton
 Draper, F. W. Enosburg Falls
 Dana, E. J. North Pomfret
 Donahue, J. F. Vergennes
 Doe, G. A. Newbury
 Dutton, F. B. Woodstock
 Davis, G. A. Rutland
 Donahue, W. F. Ferrisburg
 Donahue, T. E. Hinesburg
 Dodge, Harrison Morrisville
 Donahue, D. G. East Charlotte
 Davis, George F. Cavendish
 Darling, E. L. East Burke
 Davis, G. N. Castleton
 Downer, Charles Sharon
 Davis, C. H. E. Healdville
 Davis, F. L. Hartford
 Dagon, M. R. Madison, Wis.
 Dremann, R. E.,

State College, Ames, Iowa

Dodge, L. B.,

300 No. Main St., Barre

Davis, Geo. H. Hubbardton
 Dunsmore, Geo. H.,

R. F. D., St. Albans

Dunklee, A. A. So. Vernon

E

Eldred, H. S. Sheldon
 Ellis, I. L. Middlebury
 Edson, E. A. Chester
 Eddy, C. F. Stowe
 Ellis, Edward A. Castleton
 Estee, James B. Montpelier

F

Federal Trade Commission,
 Washington, D. C.
 Farm Stock Success

Chenango, N. Y.

Foster, F. O. Lansing, Mich.
 Flint, J. S.,

155 Loomis St., Burlington

Flint, J. P. Montpelier
 Fisher, L. C. Cabot

Farrington, C. W. West Danville

Fletcher, William Essex Junction

Fassett, G. S. Enosburg

Fisher, D. W.,

Marbridge Bldg., New York, N. Y.

Ferson, B. W. Goshen, N. Y.

Fassett, B. F. Enosburg Falls

Fassett, W. G. Enosburg

Fuller, C. C. Jonesville

Fowler, F. E. South Royalton

Fletcher, Ex-Gov. A. M., Cavendish

Fraser, W. J. Urbana, Ill.

Fillmore Farms Bennington

Fuller, B. J. Williston

The Free Library,
 17th and Spring Garden St.,

Philadelphia

Farnham, H. M. Montpelier

Fuller, W. C. Richmond

G

Gale, P. R. Stowe

Gates, Gov. C. W. Franklin

Gibbie, Geo. Groton

Grout, L. D. Morrisville

Grout, J. Ex-Gov. Derby

Gloyd, Jesse Richmond

Gilman, A. A. Randolph Center

Goodspeed, Nelson St. Albans

Gallup, J. A. West Woodstock

Giddings, F. L. Orwell

Greene, G. F. So. Pomfret

Gates & Son, Charles

North Hartland

Gale, J. E. Guilford

Goss, W. G.,

R. F. D. No. 4, St. Johnsbury

H

Howie, A. F. Mrs.,
Elm Grove, Wis.
Hewitt, J. D. North Pomfret
Hill, W. N. Starksboro
Hathaway, F. M. St. Albans Bay
Hooper, V. A. Blockton, Ark.
Hastings, S. J. Passumpsic
Harvey, Cloud Barnet
Hills, J. L. Prof. Burlington
Hayward, G. M. Middlebury
Heller & Merz Co.,
505 Hudson St., New York City
Hotchkiss, C. A. Georgia
Hefflon, Franklin. Highgate Center
Hutchinson, William. Norwich
Hill, H. C. Isle La Motte
Hillis, E. C. North Montpelier
Howard, Ernest S. West Hartford
Hall, L. C. Westford
Herick, A. A.,
R. F. D. No. 2, Milton
Hall, Charles. Montpelier
Head, George G. Montgomery
Harwood, J. W. Orwell
Hewitt, Stephen. North Pomfret
Hoadley, A. E. South Woodstock
Howe, W. H.,
R. F. D., South Royalton
Hayes, J. R. Stafford
Hitchcock, Ernest. Pittsford
Higley, Nathan. Richmond
Hodges, R. W. Springfield, Mass.
Harwood, Burr,
R. F. D. 1, Salem, N. Y.
Harris, S. L. Proctor
Huntley, George M.,
R. F. D., Fairfax
Hopkins, Hermann, Jr.,
Sheldon Jct.
Harrington, W. H. North Pomfret
Hyde, Wheeler & Co.,
41 N. Market St., Boston
Hastings, C. A.,
17 Union St., Springfield
Hayward, F. R. West Fairlee
Heath, W. E. Sharon
Hood, H. P. & Sons. Woodstock
Hood, C. H.,
494 Rutherford Ave.,
Boston, Mass.
Howe, E. L., R. F. D. So. Ryegate
Hazard, G. M. Charlotte
Hewitt, Mary No. Pomfret
Howard, E. S. W. Hartford

I

Iowa State Library,
Des Moines, Iowa
Isham, Ed. St. George
Irish, V. H. Enosburg Falls

J

Jones, E. H. Waitsfield
Jackson, L. A. Hartford
Jackson, J. J. Fair Haven
Judd, Morton Windsor
Jaynes, R. F.,
65 Central Ave., Lynn, Mass.
Jewett, A. & Son. Middlebury
Jones, G. M. Waitsfield
Jenne, A. M. R. F. D., Richford
Johnson, C. C. Pomfret
Jennings, B. C. E. Hardwick
Jewett, Alden H. Williamstown

K

Kelley, G. A. Underhill
Kingsley, C. J. West Salisbury
Kingsley, H. E. Montgomery
Kinnerson, J. R. Peacham
Kidder, N. D. Hastings, Neb.
King, M. D. Woodstock
Kneeland, D. A. Waitsfield

L

Leonard, Geo. Brandon
Lyster, H. L. Wells River
Lilly, J. O. Plainfield
Lyster, T. H. St. Johnsbury
Lawrence, Henry. St. George
Lawless, C. G.,
North Haverhill, N. H.
LePage, Charles. Barre
Loveland, J. H. Norwich
Leary, J. A. Jericho
Leonard, W. B. Orleans
Lewis, M. J. Woodstock
Lewis, A. L. Rochester
Lilley, C. M. Marshfield
Leonard, C. H. No. Pomfret

M

McCuen, R. W. Vergennes
Maynard, A. S. Bakersfield
Marvin, Thomas. Montpelier
Mosely, F. W. Clinton, Iowa
Messer, F. A. Greensboro
Moore, A. A. Richford
Maxham, G. R. Woodstock
Merrill, H. J.,
R. F. D., No. 2, Burlington

Milligan, F. B. Walden
 McMahon, C. L. Stowe
 McLam, J. F. So. Ryegate
 Macomber, F. H. Shelburne
 McNall, J. M. Milton
 McGaffey, E. E.,
 Board of Trade Bldg.,
 Boston, Mass.
 Martin, C. D. East Corinth
 Melvin, A. D., Chief of Bureau
 Animal Industry,
 Washington, D. C.
 Mass. Agricultural College,
 Amherst, Mass.
 McDonough, P. M. Hinesburg
 McCauley, D. F. Shoreham
 Martin, O. L. Plainfield
 McLam, G. E. Topsham
 Moody, Mark L. Waterbury
 Metcalf, R. H. Stowe

N

Nelson, David,
 34 Allen Ave., Springfield, Mass.
 Newton, C. H. Fargo, North Da.
 Nay, Y. G. Jericho
 Northrup, P. B. B. Sheldon
 Newell, Bigelow Stowe
 Nute, Byron. Lakeville, Mass.
 Newton, W. D.,
 R. F. D., St. Albans
 N. H. Agricultural College,
 Durham, N. H.
 N. Y. State Library, Albany, N. Y.
 Noyes, E. H. Sharon
 Noyes, M. C. Sharon

P

Plummer, E. G. Groton
 Public Library St. Louis, Mo.
 Porter, W. C. Sharon
 Page, L. B. Randolph Center
 Parker, E. J. Grand Isle
 Parker, J. B. Whiting
 Paine, C. S. Bethel
 Piper, Arthur Vergennes
 Pery, E. B. & Son. Ira
 Page, C. S., Ex-Gov. Hyde Park
 Powers, William. Brandon
 Perry, S. E. South Pomfret
 Pierce, J. H. Franklin
 Phillips & Son. E. Candia, N. H.
 Pierce, C. C. East Clarendon
 Place, R. H. Essex Junction
 Perkins, W. E. Pomfret
 Palmer, George. New Haven
 Palmer, C. E. New Haven

R

Richardson, A. E. Burlington
 Rie, Eli West Charleston
 Russell, F. L. Shrewsbury
 Richmond, H. J. Deerfield, Mass.
 Roberts, D. W. West Hartford
 Reynolds, M. W. Middlesex
 Robbins, Henry Middlebury
 Roberts, L. J. Waterbury
 Ruggles, E. H. Westford
 Rice, H. W. Brookside
 Rutherford, W. L.,
 Waddington, N. Y.
 Ricker, N. H. Ryegate
 Russell, F. L. Cuttingsville
 Ridlon, M. R.,
 R. F. D., Cuttingsville
 Robbins, H. E. Derby
 Ryan, D. E. Orwell
 Roberts, G. V. Milton
 Roundy, Charles C.,
 136 Paine St., Worcester, Mass.

S

Smith, W. E. Brighton, Mass.
 State Dairy Bureaus,
 State House, Boston
 Shackford, Mrs. C. J. Nelson
 Ryegate
 Stone, W. P. Strafford
 Sawyer, A. G. Groton
 Spear, V. I. Randolph
 Strong, P. W. North Pomfret
 Slocum, A. R. South Burlington
 Stanhope, Spencer,
 Berkshire Center
 Stevens, S. H. Enosburg Falls
 Snell, T. T. North Enosburg
 Stiles, G. M. Morrisville
 Standard Package Co.,
 Board Trade Building,
 Boston, Mass.
 Small, Fred M. Morrisville
 Stevens, N. C. West Glover
 Sanderson, W. L. Milton
 Sowles, A. P. St. Albans
 Smead, C. D. West Brookfield
 Seely, H. M. Middlebury
 Smith, E. L.,
 Miracles District,
 Lindsey, Tulare Co., Cal.
 Spaulding, L. C. Poultney
 State Library Concord, N. H.
 Sherburne, A. E. North Pomfret
 Smith, N. E. Richford
 Staples, Rev. C. J.,
 Honorary Member,
 Burlington

Saunders, M. C., 61 Chatham St.,
Boston, Mass.

Smith, F. V.....Stowe
Smith, George G.....St. Albans
Simpson, W. G.....So. Ryegate
Smith, F. L.....Fletcher
Sowles, E. A.....St. Albans
Smith, E. C., Ex-Gov.....St. Albans
Sprague, N. T. Jr.,

Brooklyn, N. Y.
Strihues, J. J.....Randolph
Snow, Mrs. Edward,

Swansey, N. H.
Sprague, George K.,
East Brookfield

Swan, P. B.....Montgomery
Scarff, C. W., Col....Seattle, Wash.
Sellew, Robt, P.,

7 Merchants Row, Boston, Mass.
Sudendorf, E.,
412 E. Monroe St.,

Springfield, Ill.

Stone, M. S.....Montpelier
Stone, E. A.....Williamstown
Seaver, W. H.....Taftsville
Somers, C. L.....South Peacham
Smith, E. E.....West Rutland
Sykes, A.....Hinesburg
Sisson, Ellsworth,

P. O. Box 1176,
Providence, R. I.

T

The Jewish Farmer,
17 Second Ave.,

New York, N. Y.

Towne, E. B.....Milton

Turnbull, J. G.....Orleans

Tarbox, C. Jericho

Towle, E. R.....Enosburg Falls

Teachout, S. D.....Essex Junction

Tarbell, E. S.....Montgomery

Terrill, G. H.....Morrisville

Tottingham, L. H.....Shoreham

Talcott, D. L.....Williston

Talcott, L. F.....Williston

Talcott, J. R.,

1760 High St., Oakland, Cal.

Talcott, Frank.....Williston

Tarwell, F.....Hampton, N. Y.

Terrill, A. N.....Morrisville

Temple, G. H.....Randolph Center

Towle, W. W.....Enosburg Falls

Trescott, A. J.....West Rutland

Tracey, J. E.....Burlington

Tear, Frank...R. F. D., W. Rutland

U

Union Association Press,
47 Ann St., New York

V

Vall, H. W.....Randolph

Van Patten, W. J.....Burlington

Varney, W. M.....Vergennes

W

Washburne, R. M., University Farm
St. Paul, Minn.

Willard, E. G.....No. Hartland

Warren, L. H.....North Pomfret

Willey Bros. Cambridge

Ware, O. T.....Brattleboro

Whitcher, J. R.,

R. F. D. No. 3, Groton

Williams, W. H.....Rutland

Wright, Will W.....Brandon

Wheeler, N. B.,

Bakers Mills, N. Y.

Wry, I. A.....St. Albans

Washburn, Chat. Brandon

Williams, N. G.....Bellows Falls

Walker, N. S.....Clarendon Springs

Woodward, J. S.....Enosburg

Winslow, H. L.....North Clarendon

Weed, E. D.....Hinesburg

Warren, Rufus Montpelier

Wheelock, H. R.....Montpelier

Wright, J. J.....So. Hero

Whipple, Obed Jr...North Pomfret

Wheeler, F. H.....Proctorsville

Whitney, Ed....Minneapolis, Minn.

Wright, H. S.....North Williston

Willard, D. S.....North Hartland

Whitney, H. O.....Essex Junction

Whitelaw, F. R.....Randolph

Wheeler, W. H.....South Pomfret

White, A. R.....Burlington

Wallace, Sidney Waterbury

Walker, H. W.....South Woodstock

Williams, J. B.,

Glastonbury, Conn.

Webb, J. T...New Braintree, Mass.

Weed, B. W.....St. Albans

Whitman, C. D. Fishers Island,

New London, Conn.

Warner, B. F.....East Burke

Wilson, James Ex Sec'y Agr.,

Tama, Iowa

Winslow, Chas. L...No. Clarendon

Note—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)

CHITTENDEN COUNTY.

Name of Plant.	Name of Operator.	Creameries.		
		Post Office Address.	Name of Maker or Manager.	Post Office Address.
Jonesville Cry.	Borden Cond. Milk Co.	Richmond	C. C. Fuller	Jonesville
Lake Champlain Cry.	W. B. Johnson	Essex Jct.	A. D. Lavine	Essex Jct.
Westford Cry.	Westford Cry. Co.	Westford	H. E. Pierce	Westford
The Cooperative Cry.	The Coop. Cry. Co.	Underhill	Roy Montgomery	Underhill
Johnson Cry.	L. W. Johnson	Huntington	L. W. Johnson	Huntington
Donahue's Cry.	M. F. Donahue	Essex Jct.	M. F. Donahue	Essex Jct.
Burlington Coop. Cry.	Burl. Coop. M. Pro. Co. Inc.	Burlington	M. Atherton	Burlington
White's Cry.	White's Pure Milk Pro. Co.	Burlington	A. R. White	Burlington
Shipping Stations.				
Colchester Cry.	Borden Cond. Milk Co.	Richmond	E. W. Fisher	Colchester
Brown's River Cry.	Borden Cond. Milk Co.	Richmond	John Hopkins	Essex
Shelburne Cry.	Shelburne Coop. Cry. Co.	Shelburne	W. H. Prindle	Shelburne
Richmond Cry.	Rich. Farms Coop. Cry. Co.	Richmond	M. J. Quinn	Richmond
Cloverdale Cry.	Bryant & Chapman Co.	Hartford, Conn.	W. H. Gomo	Cambridge
Whiting Sta.	D. Whiting & Son.	Boston, Mass.	H. E. Mooney	Milton
Borden's Sta.	Borden's Cond. Milk Co.	Richmond	W. D. Agen	Underhill
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	I. Booska	Charlotte
Lake View Cry.	Lake View Coop. Cry. Co.	Charlotte	P. R. Aunchman	Charlotte
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Ed. Shores	Milton
Oak Hill Sta.	Borden Cond. Milk Co.	Richmond	C. G. Austin	Williston
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Fred James	No. Williston
Borden's Sta.	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg
Condensaries.				
Borden's Condensary	Borden Cond. Milk Co.	Richmond	F. H. Shepardson	Richmond
Borden's Condensary	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg
ESSEX COUNTY.				
Creameries.				
Brighton Cry.	Simmons & Hammond	Portland, Maine	H. O. Humphrey	Island Pond
Trout Brook Cry.	A. M. Baker	Concord	J. R. Ralston	Concord

H. P. Hood & Son	H. P. Hood	Shipping Stations.		Concord
H. P. Hood & Son	H. P. Hood	Charlestown, Mass.	Charlestown, Mass.	E. Concord
FRANKLIN COUNTY.				
Creameries.				
Maple Leaf Cry.	E. Trahan	Swanton	E. Trahan	Swanton
Clover Leaf Cry.	C. O. Harvey	Fletcher	H. C. D. Smith	Fletcher
Franklin Co. Cry.	Franklin Co. Cry. Ass'n	E. Berkshire	L. H. Burton	E. Berkshire
Maple Hill Cry.	Maple Hill Cry. Inc.	E. Berkshire	D. A. Johnson	E. Berkshire
Missisquoi Valley Cry.	Maple Hill Cry. Inc.	Richford	P. O. Noso	Richford
Shipping Stations.				
Green's Corners Cry.	H. P. Hood & Sons	Charlestown, Mass.	H. E. McNamara	Green's Corners
Wachusett	E. H. Thayer	Enosburg Falls	E. E. Derby	Enosburg Falls
Fairfax Cry.	H. P. Hood & Sons	Charlestown, Mass.	H. J. Conner	Fairfax
D. Whiting & Son	D. Whiting & Sons	Boston, Mass.	H. E. Mooney	St. Albans
Alden Bros.	Alden Bros.	Boston, Mass.	F. E. Brady	E. Fairfield
Sheldon Cry.	Hood & Sons	Charlestown, Mass.	M. D. Mack	Sheldon
Hood's Plant	Hood & Sons	Charlestown, Mass.	Jim Berry	Sheldon Jct.
Hood's Plant	Hood & Sons	Charlestown, Mass.	F. M. Adams	E. Fairfield
Hood's Plant	Hood & Sons	Charlestown, Mass.	W. J. Jennings	Fairfield
		Charlestown, Mass.	A. E. Doney	Highgate Center
Condensaries.				
Federal Packing Co.	Federal Packing Co.	Enosburg Falls	O. L. King	Enosburg Falls
Hood's Plant	Hood & Sons	Charlestown, Mass.	C. Douglass	St. Albans
Maple Hill Cry.	B. H. Combs	East Berkshire	B. H. Combs	E. Berkshire
GRAND ISLE COUNTY.				
Creameries.				
So. Hero Cry.	So. Hero Coop. Cry. Ass'n	So. Hero	Thos. Orne	So. Hero
Pearl Creamery	Grand Isle Coop. Cry. Co.	Grand Isle	Fred Chadwick	Grand Isle
Jordan Bay Cry.	R. H. Wilcox	Isle La Motte	F. A. Brown	Isle La Motte
Shipping Stations.				
Grand Isle County Cry.	G. I. Co. Coop. Cry. Ass'n	Grand Isle	F. A. Briggs	Grand Isle
Boston Jersey Cry.	H. P. Hood & Sons	Charlestown, Mass.	S. C. Spaulding	Alburgh

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)

LAMOILLE COUNTY.

Name of Plant.	Name of Operator.	Creameries.	
		Post Office Address.	Name of Maker or Manager.
Mt. Mansfield Coop. Cry.	Mt. Man. Coop. Cry. Ass'n	Stowe	R. M. Metcalf
Shipping Stations.			
Gold Brook Coop. Cry.	G. Brook Coop. Cry. Ass'n	Stowe, R. F. D.	H. G. Fuller
Stafford & Sons Cry.	Stafford & Sons	Morrisville	Stafford & Sons
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	A. B. Judd
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn
		Cambridge Jct.	

ORANGE COUNTY.

Creameries.			
Stafford Cry.	Stafford Cry. Co.	So. Stafford	So. Stafford
Green Mt. Cry.	Green Mt. Cry. Co.	West Topsham	West Topsham
Randolph Coop. Cry.	Randolph Coop. Cry. Co.	Randolph	Randolph
Washington Cry.	Washington Cry. Ass'n	Washington	Washington
Farmers Coop. Cry. Co.	Farmers Coop. Cry. Co.	East Corinth	East Corinth
Topsham Coop. Cry.	Topsham Coop. Cry. Co.	Topsham	Topsham
Wells River Cry.	Wells River Cry. Ass'n	Wells River	Wells River
Orange Co. Cry.	Orange Co. Cry. Ass'n	Chelsea	Chelsea
Williamstown Cry.	Lyndonville Cry. Ass'n	Lyndonville	Williamstown
West Fairlee Cry.	Lyndonville Cry. Ass'n	Lyndonville	West Fairlee
Tunbridge Coop. Cry.	Tun. Coop. Cry. Ass'n	Tunbridge	Tunbridge
Vershire Creamery	Vershire Coop. Cry. Ass'n	Vershire	Vershire
Corinth Cry.	Lyndonville Cry. Ass'n	Lyndonville	Corinth
Lake Morey Cry.	Lake Morey Cry. Co.	Fairlee	Fairlee
Shipping Stations.			
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	Randolph
Boston Jersey Cry.	H. P. Hood & Son	Charlestown, Mass.	No. Thetford
Newbury Cry.	Lyndonville Cry. Ass'n	Lyndonville	Newbury
Hood's Milk Sta.	H. P. Hood & Son	Charlestown, Mass.	Boltonville
Highland Cry.	Plymouth Cry. Co.	Boston, Mass.	West Newbury

Bradford Cry.	Lyndonville Cry. Ass'n	Cheese Factories.	
	Lyndonville	Condensaries.	Lyndonville
Hood's Randolph Sta.	H. P. Hood & Son	Charlestown, Mass.	F. H. Bickford
		ORLEANS COUNTY.	L. F. Butman
		Creameries.	
Orleans Cry.	J. G. Turnbull Co.	Orleans	W. A. Badger
W. Charlestown Cry.	J. G. Turnbull Co.	Orleans	J. G. Eley
Derby Line Cry.	J. G. Turnbull Co.	Orleans	D. E. Lamberton
Lowell Cry.	J. G. Turnbull Co.	Orleans	Clark Courser
Missisquoi Valley Cry.	Miss. Vall. Coop. Cry. Co.	So. Troy	R. Brabana
Albany Cry.	J. G. Turnbull Co.	Orleans	Geo. Fox
Clyde River Cry.	U. S. Bean	Lowell, Mass.	R. H. Bishop
Black River Cry.	Jersey Cry. Ass'n	Irassburg	H. J. Bover
Jersey Star Cry.	N. C. Stevens	W. Glover	E. G. Ford
Meadow Brook Cry.	F. A. Messer	Montpeller	U. B. Bates
Caspian Lake Cry.	H. P. Hood & Son	Charlestown, Mass.	G. E. Morse
Columbia Cry.	J. G. Turnbull	Orleans	J. R. Andrews
Norton Mills Cry.		Shipping Stations.	
Newport Ctr. Cry.	H. P. Hood & Sons	Charlestown, Mass.	Chas. Hutchins
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. S. French
Glover Cry.	Lyndonville Cry. Ass'n	Lyndonville	C. M. Lyon
Derby Center Cry.	H. P. Hood & Sons	Charlestown, Mass.	M. E. Day
		Condensaries.	
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	H. L. Alexander
		RUTLAND COUNTY.	
		Creameries.	
Proctor Cry.	Vermont Marble Co.	Proctor	S. L. Harris
Hortonville Cry.	Tait Bros.	Springfield, Mass.	F. L. Gidding
Otter Creek Cry.	Jones Bros.	Brandon, R. D.	E. W. Parent
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	F. E. Richter
		Shipping Stations.	
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	C. J. Wilbur
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	R. O. Bugbee
			Proctor
			Orwell, R. D.
			Brandon, R. D.
			Fair Haven
			Wallingford
			Wallingford

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Continued.)

LAMOILLE COUNTY.

Creameries.

Name of Plant	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Mt. Mansfield Coop. Cry.	Mt. Man. Coop. Cry.	Ass'n Stowe	R. M. Metcalf	Stowe
Gold Brook Coop. Cry.	G. Brook Coop. Cry.	Shipping Stations.	H. G. Fuller	Stowe, R. F. D.
Stafford & Sons Cry.	Stafford & Sons	Morrisville	Stafford & Sons	Morrisville
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	A. B. Judd	Morrisville
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Cambridge Jct.

ORANGE COUNTY.

Creameries.

Stafford Cry.	Stafford Cry. Co.	So. Stafford	W. P. Stone	So. Stafford
Green Mt. Cry.	Green Mt. Cry. Co.	West Topsham	W. E. Hood	West Topsham
Randolph Coop. Cry.	Randolph Coop. Cry. Co.	Randolph	A. E. Johnson	Randolph
Washington Cry.	Washington Cry. Ass'n	Washington	O. E. King	Washington
Farmers Coop. Cry.	Farmers Coop. Cry. Co.	East Corinth	L. A. King	East Corinth
Topsham Coop. Cry.	Topsham Coop. Cry. Co.	Topsham	C. E. McLam	Topsham
Wells River Cry.	Wells River Cry. Ass'n	Wells River	H. L. Lyster	Wells River
Orange Co. Cry.	Orange Co. Cry. Ass'n	Chelsea	L. R. Brown	Chelsea
Williamstown Cry.	Lyndonville Cry. Ass'n	Lyndonville	A. H. Jewett	Williamstown
West Fairlee Cry.	Lyndonville Cry. Ass'n	Lyndonville	F. R. Haywood	West Fairlee
Tunbridge Coop. Cry.	Tun. Coop. Cry. Ass'n	Tunbridge	H. Whitney	Tunbridge
Vershire Creamery	Vershire Coop. Cry. Ass'n	Vershire	L. S. Flint	Vershire
Corinth Cry.	Lyndonville Cry. Ass'n	Lyndonville	F. D. Little	Corinth
Lake Morey Cry.	Lake Morey Cry. Co.	Fairlee	Wm. J. Phillips	Fairlee
C. Brigham Sta.	C. Brigham Co.	Shipping Stations.	J. J. Stimefs	Randolph
Boston Jersey Cry.	H. P. Hood & Son	Cambridge, Mass.	J. B. Broadhead	No. Thetford
Newbury Cry.	Lyndonville Cry. Ass'n	Charlestown, Mass.	G. A. Doe	Newbury
Hood's Milk Sta.	H. P. Hood & Son	Charlestown, Mass.	E. F. Corliss	Boltonville
Highland Cry.	Plymouth Cry. Co.	Boston, Mass.	J. W. Layten	West Newbury

Bradford Cry.	Lyndonville Cry. Ass'n	Condensaries.	F. H. Bickford	Bradford
Hood's Randolph Sta.	H. P. Hood & Son	Charlestown, Mass.	L. F. Butman	Randolph
ORLEANS COUNTY.				
Orleans Cry.	J. G. Turnbull Co.	Creameries.	W. A. Badger	Orleans
W. Charlestown Cry.	J. G. Turnbull Co.	Orleans	J. G. Eley	W. Charlestown
Derby Line Cry.	J. G. Turnbull Co.	Orleans	D. E. Lamberton	Lowell
Missisquoi Valley Cry.	J. G. Turnbull Co.	So. Troy	Clark Couseur	So. Troy
Albany Cry.	Miss. Vall. Coop. Cry. Co.	Orleans	R. Brabana	Albany
Black River Cry.	J. G. Turnbull Co.	Orleans	Geo. Fox	E. Charlestown
Clyde River Cry.	U. S. Bean	Lowell, Mass.	R. H. Bishop	Craftsbury
Jersey Star Cry.	Jersey Cry. Ass'n	Irassburg	H. J. Bover	Irassburg
Meadow Brook Cry.	N. C. Stevens	W. Glover	E. G. Ford	Glover
Caspian Lake Cry.	F. A. Messer	Montpeller	U. B. Bates	Greensboro
Columbia Cry.	H. P. Hood & Son	Charlestown, Mass.	G. E. Morse	No. Troy
Norton Mills Cry.	J. G. Turnbull	Orleans	J. R. Andrews	Norton
Newport Ctr. Cry.	H. P. Hood & Sons	Shipping Stations.	Chas. Hutchins	Newport Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	R. S. French	Barton
Glover Cry.	Lyndonville Cry. Ass'n	Charlestown, Mass.	C. M. Lyon	Glover
Derby Center Cry.	H. P. Hood & Sons	Lyndonville	M. E. Day	Derby Center
H. P. Hood & Sons	H. P. Hood & Sons	Charlestown, Mass.	H. L. Alexander	Orleans
RUTLAND COUNTY.				
Proctor Cry.	Vermont Marble Co.	Creameries.	S. L. Harris	Proctor
Hortonville Cry.	Tait Bros.	Proctor	F. L. Gidding	Orwell, R. D.
Otter Creek Cry.	Jones Bros.	Springfield, Mass.	E. W. Parent	Brandon, R. D.
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	F. E. Richter	Fair Haven
C. Brigham Sta.	C. Brigham Co.	Shipping Stations.	C. J. Wilbur	Wallingford
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	R. O. Bugbee	Wallingford

List of Creameries, Shipping Stations, Cheese Factories and Condensaries—(Concluded.) WINDSOR COUNTY.

Creameries.			
Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.
Elm Valley Cry.	Belknap & Sons	Cavendish	D. H. Belknap
Hood's Cry.	H. P. Hood & Sons	Charlestown, Mass.	Cavendish
Middle Valley Cry.	Myron J. Buck	East Bethel	Woodstock
W. Riv. Valley Coop. Cry.	W. R. Val. Coop. Cry. Ass'n	Rochester	E. Bethel
Maplehurst Cry.	J. H. Mussey	Stockbridge	Rochester
Silver Lake Cry.	F. E. Allen	Barnard	Stockbridge
S. & F. Cry.	F. E. Fowler	So. Royalton, R. D.	Barnard
Moore's Cry.	E. F. Moore	So. Royalton, R. D.	So. Royalton, R. D.
Harrington Cry.	H. H. Densmore	Bethel	So. Royalton, R. D.
Sherburnes Cry.	A. E. Sherburne	No. Pomfret	Bethel
Sharon Coop. Cry.	Sharon Coop. Cry. Ass'n	Sharon	No. Pomfret
West Hartford Cry.	A. L. Dow	West Hartford	Sharon
Shipping Stations.			
Whiting Cry. Sta.	D. Whiting & Son	Boston, Mass.	West Hartford
Whiting Sta.	D. Whiting & Son	Boston, Mass.	Hartland F. Corners
Hood's Sta.	H. P. Hood & Sons	Charlestown, Mass.	Ascutneyville
Child Bros. Cry. Sta.	Child Bros.	Waltham, Mass.	Norwich
Manchester Cr'm Co., Sta.	Manchester Cry. Co.	Windsor	Brownsville
Cheese Factories.			
Plymouth Cheese Fct'y	Plymouth Cheese Co.	Plymouth	Windsor
Nickles Hopsas Ch. Fct'y	Nickles Hopsas	So. Royalton, R. D.	Plymouth
			So. Royalton, R. D.

Where no other state is mentioned the address is Vermont.
Owing to war conditions a number of the creameries, shipping stations and cheese factories have been temporarily closed or combined with others into larger ones.

The condensaries are counted with the shipping stations because they often ship milk and cream. All those plants which have one or more large vacuum condensing pans are listed as condensaries.

Several of the creameries, ship milk and cream at odd times and several make some cheese. A number of the shipping stations also make butter and cheese. The cheese factories often make a little butter and ship milk and cream.



REPORT
OF THE
FIFTIETH ANNUAL CONVENTION
OF THE
VERMONT DAIRYMEN'S ASSOCIATION

HELD AT

University of Vermont Gymnasium

Burlington, Vermont

January 13, 14, 15, 1920



ST. ALBANS MESSENGER CO.
1920

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**OFFICERS OF THE VERMONT DAIRYMEN'S
ASSOCIATION.****PRESIDENT**

S. L. Harris.....Proctor

VICE-PRESIDENTS

E. C. Hillis.....E. Montpelier
G. H. Terrill.....Morrisville

SECRETARY

O. L. Martin.....Plainfield

TREASURER

W. H. Harrington.....North Pomfret

AUDITOR

F. L. DAVIS.....Hartford

**PROCEEDINGS OF THE 50th ANNUAL MEETING OF THE
VERMONT DAIRYMEN'S ASSOCIATION.**

THE GYMNASIUM, UNIVERSITY OF VERMONT, BURLINGTON,
VERMONT, JANUARY 13, 14, 15, 1920.

The 50th Annual Meeting of the Vermont Dairymen's
Association convened at 2 o'clock, January 13th.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

God of the snow-storm, God of the sun-shine, grant that we may be kept true to Thy purpose in us and Thy thought in our higher life; grant that as we gather here we may learn the lessons of Thy providence and understand more deeply the laws of Thy creation. In the midst of the confusion of the times, O God, give unto us Thy guiding Light, the Light of Truth, the Light of Honor, the Light of Service, the Light of Fidelity. Grant unto us strength and wisdom that we may care for all things Thou hast given into our keeping,—the members of our home and fireside; those with whom we associate in our business, and the creatures of the field. Our Father, grant that we may wisely use the instruments Thou hast placed in our hands, that we may grow in goodness. Make us mindful of the soul within; that we may be steadfast in our allegiance to the things that are pure and honest; grant us to realize that all we possess is but loaned us for a season, by the use of which we may unlock some of the secrets of Thy creation. Protect our land, Great God! Give unto our leaders the principles of righteousness and of faith. When Thou art done with us here, give unto us the hope of a larger service, a higher wisdom and a finer faith in the life beyond. In the name of the Master we ask Thy blessing upon us. Amen.

ADDRESS OF WELCOME.

MAYOR J. HOLMES JACKSON.

Members of the Vermont Dairymen's Association and of the Vermont Maple Sugar Makers' Association:

This City is again honored in having the joint annual meeting of your Associations held here. The many annual conventions and other meetings held in this City is proof that Burlington is at least a convenient place for such gatherings. We have not yet a convention hall but you and others find quarters which I hope are fairly suitable.

The members of these two Associations are among Vermont's most worthy citizens. You not only speak well of the State, but you do much to advance its best interests. Vermont maple sugar is the standard everywhere; it has no equal. This is an important industry and I hope the maple orchards will not be cut down. The dairy industry in the state also brings Vermont to the front wherever its products are displayed.

We hear it often said that Vermont is noted for men, women and maple sugar. We must add her dairy products, making four things for which the Green Mountain State is noted.

On behalf of the City I extend to you, and each of you, a most cordial welcome. I hope you find here a place suitable for your meetings and your exhibits. I also hope you will find here a people who appreciate your visit, and who value your endeavors to advance these two great industries, which you so ably represent at this meeting.

RESPONSE TO ADDRESS OF WELCOME.

F. L. DAVIS, HARTFORD.

As spokesman at this time, I desire to say in behalf of the Association that we are grateful for this hearty welcome from the Mayor of this popular convention city of Vermont.

Since my first personal introduction to the Vermont Dairymen's Meeting thirty-four or thirty-five years ago, without a single omission since, (a record of which I am proud) we have received Burlington's welcome nineteen or twenty times during this period.

We like to come to Burlington for several reasons: first, Burlington always gives us a glad and cordial greeting to her city; second, it is a great incentive to all dairymen and creameries to have the double opportunity of getting the great educational benefits of attending these meetings, and at the same time be privileged with visiting our Agricultural College, the State Farm, and its herd of dairy cows and all that goes with it; some years the dairy school is in operation—all of which is very interesting as well as educational to us all who are interested in agricultural work. Many of our farmers would not have these opportunities were these meetings held elsewhere; third, Burlington has the best hotels in the State and can take care of all who attend these conventions, which is appreciated. We dislike very much to go out to private homes for rooms.

The Dairymen's Association was organized in 1869—fifty years ago. Great changes have been brought about since then in the progression of Dairy and Creamery work and the machinery with which to do it. It is simply wonderful. The last and one of the most wonderful inventions, at this critical time, for help on the farms, is the milking machine. Here is the great problem that the farmers are up against—the help—high wages and short hours. The railroads, machine shops, mills, etc. are getting our young men from the farms. Can we blame them? I don't care to answer this question.

We have got to study this problem of how to interest our boys so that they will stay on the farm. I believe that there are great opportunities in agriculture for them there in the future.

Mr. O. S. Bliss was the first Secretary of the Dairy-men's Association. This office was held by him for several years. Associated with him were such men as O. M. Tinkham, E. S. Wood, H. W. Vail, Douglass, Peck, and many whom I might mention. These men have passed beyond. The officers who make up the present board little realize the trials, discouragements, and propositions they were up against in those days—and for many years which followed. At that time there were no State funds, all bills had to be paid from receipts for membership, subscriptions or private donations. The meetings were held about the State more than now. In the last fifteen years the Association has become the largest in the United States with the exception of Wisconsin, I believe, and we believe there is only one place in Vermont large enough for the Convention, and that the Queen City.

RESPONSE.

S. L. HARRIS, PROCTOR.

Members of the Vermont Dairymen's Association, Ladies and Gentlemen:—

At this Convention we are meeting for the fiftieth anniversary of the Dairymen's Association. This association is one of the oldest, also one of the largest in the United States.

We seem to meet under different conditions of the country each year. For the last few years it has been under war conditions. This year we are thankful that times have changed and the World War is at an end.

We are glad to meet once again in Burlington. We have heard in years gone by about too much Burlington, but I do not think we can get too much Burlington for a meeting of this kind, with your beautiful scenery and the hospitality of your people and your fine hotels.

The main topic of the country today is the high cost of living. My idea is to raise more food products and keep up the war gardens in cities and towns, raise more potatoes and vegetables, and not depend on the farmer to raise them for you. The farmer has all that he can handle with the help question of today to produce more grain, corn, and ensilage to feed his stock. What is hard and difficult for the farmer is to get help to milk. A good many of the farmers are installing milking machines and this solves the milking question to a great extent. We hear considerable about milking machine flavor in the milk and cream, also in the butter. We can remember only a few years ago when there was the same report about ensilage; some could not drink the milk or eat the butter on account of the ensilage flavor. The farmer cannot make milk in winter at a profit without a silo. From the creamery man's point of view I cannot agree on the farmer selling his milk. I believe in keeping the skim milk on the farm regardless of the few extra dollars you get for the whole milk. We need to raise more calves; as you all know, the cows are growing less in number in our State, therefore, a greater need of raising more stock to help out our country in the high cost of living.

THE IMPORTANCE OF BETTER SIRES.

PROF. O. M. CAMBOURN, EXTENSION DEPARTMENT,
UNIVERSITY OF VERMONT.

The cow population of the United States has not kept pace with the increase of the human population. In fact, in this state the records of some years have shown a decrease in the cow population. However, the number is not the important item for consideration, but rather the total amount of milk produced for the market. The number of cows is held about even at the present time, due to the demand for dairy products and through the encouragement through the price of butter, cream and milk.

Then too, many of the countries overseas lost a part of their dairy cattle and have looked to this country for pure bred cattle to replace their losses. The foreign demand for dairy products has also been good, but these demands will decrease as the foreign countries restock their farms and return to the producing class.

South America also is looking to the United States for dairy cattle. The southern states of our own country are purchasing freely of high quality animals in order that they may have the right kind of a foundation.

Therein lies the importance of the better sires, in order that the production of our dairy cows as a whole may be raised and thus have greater total production and higher quality animals for sale to supply the demands of buyers.

The consumer is asking for lower prices, so that he may use more dairy products. What are we as dairymen doing to bring about this lower price? Manufacturers, to secure a return on invested capital, have followed a plan of purchasing raw materials as cheaply as possible; have constantly tried to improve the factory operation by using better machinery and better methods and through advertising and good salesmanship have created a public demand for their goods. Cannot the dairyman strive to secure a lower cost of milk by similar methods? The raw materials of feeds may be secured by better pastures, more leguminous hays and purchase of grains in large quantities, either individually or collectively. Some advertising of dairy products is being done, but closer consideration should be given to

this as well as to the selling end through your various dairy organizations.

The more efficient manufacture of milk is possible with the dairymen as with any manufacturer by the use of more efficient machinery—better cows. The future herd, every dairyman hopes to have more productive than the present one. Therefore better sires are worthy of first consideration, as their offspring will be the future herd.

A thorough study of production records of Cow Testing Associations, of not only this state but many states, shows the average production of those records to be rather low, in Vermont that average annual production is near 5,000 lbs. of milk. As one looks over the records the number of animals producing below the average is greater than the number of animals producing above the average. Part of this startling fact may be due to the low producing class, including some young animals. But in a broad way, if no other influence maintained except the female line, the tendency would be for lower production, since there are more animals producing less than the average production of the entire number in the records. Furthermore, a study of these production records shows that over one sixth of the animals in the records were not profitable producers. They more than paid for their feed but not enough more to meet the other costs of production. Those animals which produced above the average production, broadly speaking, returned about 150 per cent more than their cost of feed. These are the efficient producers and are manufacturing milk at a lower cost than the entire lot of animals. How can the dairyman secure these good producers? By using Better Sires and Better Feeding Methods. Consider, if you will, that the herd sire is really more than half the herd, as he influences every offspring, while each female influences but one offspring annually. Therefore, the very best sire obtainable with the money available is none too good for those cows in the low producing class. Consider also, that the sire used must be from ancestors which were much better producers than the cows with which the sire is to be mated. The Better Sire, to be sure, should be pure-bred, from good producing ancestry, and a strong individual. The selecting of the right sire is worthy of great consideration, as he is the making or breaking of the future herd. The real worth or measurement of a sire is not only whether he is pure-bred, from good producing ancestors and a strong individual, but rather what can he do, what kind of producers are his heifers. In order to be able to make this measurement of a bull, he must be at least five years of age before

his first heifers have reached the end of their first lactation period. Many times bulls are sold and slaughtered before the heifers come into production. Many examples can be cited in any breed of valuable bulls which have been slaughtered before they were five years of age, only to learn that their daughters were making very marked increases in production over the dams. One bull in Wisconsin left 7 daughters which averaged to produce yearly 10,720 pounds of milk, containing 555 pounds of butter fat. Losing bulls of this ability is detrimental to the dairy industry. The men of a community could well afford to keep track of such bulls and purchase them for use in the smaller herds, cooperatively. Many times we hear of bulls in other states with a long string of producing daughters to their credit. The same comments can come to Vermont dairymen provided they will keep the bulls alive and test out the daughters and know what they are doing. In fact, there is one Vermont breeder who has done that very thing and the herd bull, which is still living, has to his credit thirteen two year old daughters, with an average production of 481 pounds of butter fat for the entire lot, and every daughter that has freshened has been tested. May there be more of this kind of record keeping in Vermont. Keep a close watch of these bulls and encourage all dairymen to use better sires.

TUESDAY EVENING SESSION.

Van Ness House dining room.

In charge of Vermont Guernsey Breeders' Association, President Moody presiding. The hotel orchestra played and singing of community songs was directed by C. F. Ernst.

Professor C. H. Royce, assistant, in the department of Animal Husbandry, at Cornell University, was one of the speakers. He said in part:—

Mr. Chairman, Ladies and Gentlemen:—

I am glad to meet Guernsey breeders outside New York state and it gives me real pleasure to see that the breeders of Vermont are just as enthusiastic as our men in New York are over a breed the peer of which has not yet been discovered. The profession of breeding Guernsey cattle interests me from the standpoint of a man who has tried to build up a little herd of Guernseys. Before I started to breed them for myself I gained some little experience at the expense of some other men, so perhaps I had advantageous ground over the ordinary man in starting, but I have been subject to all the ills and disappointments that all

other men are subject to, and I have had some of the successes that other men have had, in a small way, when they began to breed Guernsey cattle. The subject, that phase of breeding that we are to discuss tonight, pure bred sires is one which looms largest among our problems. The male, mated with a considerable number of females and having equal weight with each of them, and no more so far as I know, is of importance just simply because he is not only half of the herd but he is half of the influence that is going to bring about that new individual life that as a unit of your herd is going to make or break you so far as that particular animal is concerned.

In general in our State we are concerned about the sires in use, and we are concerned because we had hoped to put across a scheme of removing from its baneful influence on the herds in New York State, the sire. In order to know just exactly what we were talking about, a little while ago we sent out some questionnaires throughout the State, relating to the bovine population. As a result of that we have secured some astonishing information, and if you will promise not to tell, I am going to tell you that our men in New York State are still using on their herds 55 grade scrub males for every 45 pure breds. That didn't look very good to us and we were a little doubtful as to whether we could carry through any sort of a scheme that looked toward the removal of these animals. Several things presented themselves to us. In the first place, we had a few men—we had been talking about this thing for more than just the past year; we had been talking about it for years before we came to the point where we were about ready to say,—“What are you going to do about it?” We found several things that seemed to cause trouble and hesitation, and one of the first was that a few men said “We believe that our grade males raised from our own herds, from our best cows, are better than some of your pure bred scrubs.” I don't suppose in Vermont, either in the Guernsey or in the lesser breeds, that you consider there are many of that kind of pure bred animals. Notwithstanding, we must admit,—if we are keen and honest students of dairy cattle,—that there are that kind of sires, so we have to meet that question. Some men say to us “These pure bred sires that you talk about are too high priced for us”,—intimating thereby that the breeders of pure bred cattle have failed in one of two respects,—either they are holding these animals at a price that is too high and not within the reach of the ordinary breeder of livestock, or else they do not feel called upon to impress upon the people the value of these pure bred sires

in raising the standard of production in New York state. We have to meet that situation. When you come right down to actual work in the field it is a slower proposition than one thinks. It is a serious problem for us and we don't know just when the matter will end, but we are going to work on it until the time comes when we see the last scrub bull eliminated from the herds in New York state.

Mr. Onsrud is here and I know that you won't lose the opportunity to get concrete and definite information with reference to why a pure bred Guernsey bull, well chosen, with good judgment, does operate to raise the standard with the common, or perhaps I should say grade cattle.

I want to talk with you directly about what our opinions are with reference to some of the principles underlying breeding,—what has been our position with reference to breeding. It seems to me that as time goes on we may be able to discuss this question from a more intelligent standpoint; I think when the time comes that we have boys and girls sufficiently trained along biological lines in our schools, so that they understand these things we are talking about, we may then, perhaps, be able not only at meetings like this but at the farm, with the animals before us, to outline plans which will be intelligently put into operation, with reference to the breeding of dairy cattle. What has been our attitude in reference to the breeding of cattle? We have denied that the male had equal weight with the dam as a carrier of inheritance. That is proven by the fact in the olden days when a man wanted to improve his herd, instead of getting the best kind of a sire he could find, he went out and bought a few animals from some well known cow that had made 7 or 8 pounds of butter a week. So they worked in that slow fashion, never having in mind that the male had the ability to carry inheritance of that cow, and that a bull calf from that well known cow, mated with all the animals he had, might have given him a much more rapid improvement.

It was years before men even began to think seriously about inheritance as applied to cattle and that the male might carry inheritance in the same ratio as the female. That was natural to some, I suppose; they felt that since the mother carried the foetus so much longer within her body and nourished it, that her own blood, her own characteristics, would be stamped on it rather than those of the sire, whose contact was so much shorter.

We have gotten past that, and now the selection of a sire is a prominent question on every farm, where they hope to raise the standard of production in their herd.

In this work we did in New York state, we found the ages of all the pure bred sires that were owned on these farms, where we made the actual farm to farm canvass, out of every 300 bulls perhaps 90 were calves under 9 months of age; 120 were one year old; 117 were two years old; 60 were three years old; 40 were four years old; 7 were 5 years old; 5 were 6 years old and 1 was 7 years old.

We found from our estimates in individual herds, and from our actual observation, that as a rule those sires that had the greatest influence on the herd, that had the greatest influence for good in raising the production in the herds, were gone,—gone before we learned that fact,—and it has occurred not once only but more than once in my own experience, and I could cite illustration after illustration where a good sire had been sold or slaughtered (anyway it was impossible to get him back) when we should have had the benefit of his fine qualities to raise production in the herd. So it occurred to us the thing to do was to keep these bulls until they are older so we can ascertain what they are like. It has been said we ought to keep them until they are 3 or 4 years old. That is not old enough. Considering that you begin to use a sire when he is 15 months old, 9 months later his first daughters and sons are born. When these first daughters come into milk he is then 4 years of age, isn't he? and when they have gone through a milking period of one year (which is the first time we can learn of his ability of transmitting qualities of increased production) he has been dead 3 years. That simply shows the experience we have had. Any plan that we may have for the detection of these superior bulls, must have incorporated in it the keeping of these bulls until they are 5 or more years of age. Most men have serious objections to that, and yet they know beyond a peradventure that some of those objections are not well founded. They say that in-breeding should not be practiced. Why not? I read in the second chapter of Exodus "And there went a man of the house of Levi, and took to wife a daughter of Levi." Maybe they were half brother and sister—at any rate from that union came the little child that was found by Pharaoh's daughter in that little ark among the rushes; he was reared in her family and later led his people from Egyptian bondage to the Promised Land. It did not hurt Moses any to be in-bred, and yet they saw only the dark side of the picture and therefore made recommendations against it.

You are interested in Guernsey cattle. I noticed at your show today you did not take any exceptions to that little bull that showed so much of the May Rose blood on

both sides of his pedigree. Why not, if you are opposed to in-breeding?

If in-breeding is such a bad thing why have so many men practiced it with all breeds of cattle? The Guernsey cow herself is in-bred. How could it be otherwise, on the little island? they certainly must have had common ancestors. Take also the Shetland pony—there is in-breeding; and the American mustang; and yet in all of these animals are these distinctive characteristics, some of which are certainly good.

I am not here, in spite of what I have said, to recommend in-breeding unqualifiedly; not at all; because I know the picture has a dark side; but I am here to say this, that good characteristics are accentuated by in-breeding and bad ones that you have noticed obey the same law. Therefore, the thing I do recommend is that in-breeding is a means to an end.

QUESTION:—What about breeding a brother and sister?

SPEAKER:—If you have full brothers and sisters they are more nearly alike than is a father and daughter or mother and son; therefore, unless I positively had to do it, I think I wouldn't. I would rather in-breed the other way.

If you will allow me a little more on this question of in-breeding, I have to recognize that some of the things that are undesirable in a Guernsey sire are quite likely to reappear in his daughters and certainly in his granddaughters, if he is mated with these daughters. The matter of coarseness in shoulder and club tails are pretty easily transmitted,—undesirable characteristics. So we have got to watch out for these things. In such characteristics as we may see I think we are safe, but some of the most important things in breeding are things that are not so evident, and therefore we may run into trouble but may also run into trouble if we overlook the question of constitution; I am of the impression it most depends on the size and development and functioning of the vital organs. Since I can't see these vital organs I only have certain external indications of the way they are developed and the way they function, and I may be easily deceived in reference to this constitution.

You and I may practice in-breeding to good advantage and yet meet with some bad results because of the fact that we can't know as much as we would like to know about these animals, about their constitution, and things of that sort. Notwithstanding there is a dark side to the picture of in-breeding, it does allow us to keep these desirable bulls to a time when we can find out what they are like as producers,

and then if they are good use them just as long as we possibly can.

A word about the care of animals: Nine out of ten men fail along this line,—I refer particularly to the care and maintenance of high bred and valuable cattle; because they place people in charge of them who are unable to maintain the same standard of care and keeping that these animals were accustomed to, and they quickly deteriorate, and in a few generations they are worth no more than scrubs. So, if you and I are going to be good breeders of dairy cattle we have not only to study carefully and practice the mating of proper animals, and do it intelligently, but we must maintain those animals properly. Feeding and care are two ways in which we may maintain the standard of excellence in cattle and we must begin it when they are young. Unless you and I have high standards for the development of young stock in our herds we certainly will not make any money, no matter how high priced sires we may have. So, we must begin early; we must nourish the calves so they will come to maturity able to do the one thing we ask of them,—simply to digest food; that is their main function; therefore, I want every calf that is raised on my farm to be kept continuously growing by a constantly increasing ration of good, digestible food, adapted to it. An animal once stunted never comes to its best state.

If we are to be successful in our business, we must raise that type of animal that is not only thrifty of growth but that type of animal that will make use of the feed that is best adapted to it and on which the owner can make the most money,—namely, the roughage we grow on our own farms.

I am not going to discuss that question as an economic proposition, but it certainly is an important question,—the character of roughage we feed our animals; it must be roughage—good quality of roughage, adapted to the requirements of the dairy cow, and it should be a roughage that we can raise economically.

QUESTION:—What do you call good roughage?

SPEAKER:—Good hay and corn silage.

THE GUERNSEY.

M. T. Phillips, a member of the State Board of Agriculture of Pennsylvania, spoke on the topic "The Guernsey". Mr. Phillips said, among other things: "We all know the Guernsey originated on a little island about four miles wide and nine miles long; we suppose the Jerseys and Guernseys came practically from the same original stock. I think there is no doubt but that the high percentage of fat in the milk of these breeds is caused by peculiar breeding. The Holsteins have a place and a very large place in this country, their milk is particularly good for making cheese, having a large amount of casein. They are bred for that purpose.

During this convention, thus far, you have heard a great deal about breeding. In breeding one should study to be able to size up an animal, as to its general conformation, the things you like to see reproduced. It is necessary to keep records if you are to be successful. You hear people talk about burning your cows up by making these records. If you study the records that your cows make they will answer the problems for you in most cases. Every time you test a cow, as a general rule, she gets better. I know from my own personal experience, in breeding, caring for and feeding and making a few records, that if it had not been for the records I would not have gotten very far. I like breeding in families. I say families because I want more than individuals. Did you ever buy a heifer and when she came in you were disappointed in her? That ought not to discourage you. We have got to study this proposition and study it carefully. No business man ever embarks in a business proposition before he gives it some thought. Why is it that so many men—a good many times business men that have been successful in their business—go out and buy farms, wealthy men, and spend a large amount of money on them without knowing the first thing about farming? I have been told by such people they were going to apply business principles to farming. I have never known such a one to make the farm pay for the labor. There are reasons for that and one is because such a man can't compete with the farmer and his wife, who have been working for nothing in many cases. The other day I was looking over some government statistics and I noted there were ten million acres less wheat in the ground this year than a year

ago. What does that mean? It means fifteen million bushels of seed wheat short. The same shortage has come to the dairy cow. The dairy business has the brightest future it ever had. The war has set the farmers ahead years in their operations; I think they have the largest duty to perform that agriculturists have ever been called upon to perform,—to supply the demand and keep the cost down as low as they can. All farmers must be more efficient in their operations and particularly in raising dairy cows. How are they going to do it? Get a good machine and when you have the machine take care of it; give it all that it needs to keep it going. A cow is but a machine. Keep it well oiled. Produce it first, then take care of it, keep everlastingly after it and do not get discouraged.

The farmer has large responsibilities; greater responsibilities than just to take care of our own. Each of us has a mission to fulfill on this earth; each must help his neighbor.

One way we can keep our machine running to advantage is by proper feeding. Many people told me I could not raise alfalfa. I stuck to it and was able to grow it successfully. Alfalfa hay is one of the finest things to feed cattle that is grown.

Efficiency is the term. It is a matter of business, simply something that we must put our attention to, in the raising and feeding of the dairy cow if we are to succeed.

E. A. Onsrud of the Extension Service, American Guernsey Cattle Club, of Peterboro, New Hampshire, was introduced, and spoke briefly as follows:—

We find that there has been an increase in registrations during the last 7 months over the corresponding 7 months of the preceding year, of 38 per cent in females, and 35 per cent. increase in bulls. There has been an increase in transfers of 63 per cent. An increase in the general volume of business in our office of 64 per cent. We find that the registration during the last 5 years in the American Guernsey Cattle Club is just about equal the registration of all years previous. All indications point to twice the registration within the next five years that we have at the present time. It is of interest that on New Year's day, 1920, we registered the one hundred thousandth female and the bulls registered number over 62,000. Recently we have run over the records in our Guernsey Breeders' Journal to ascertain the price paid for females during the year 1919. (We have published all reports received in our office, and altho' the information given me has not been verified, still it was given me as being about correct.) We find that the

average price paid for all Guernseys at public sales in 1919 was over \$690. We find that the average price paid the preceding year was \$330. Isn't it encouraging, an increase from \$330 to \$690?

I was interested to see how these figures compare with records in other breeders' associations. The official record for the Holstein-Friesian Association shows that their average sale price in 1918 was \$261; the average sale price in 1919 was \$396, as compared to our \$690.

Another thing which we discovered in looking up the records of importation of stock,—that in 1890 the Holstein Association had made as many importations in their breed as the Guernsey Association had imported in 1914. In other words, the Holstein Association had as much seed stock in this country in 1890 as we had in 1914, so we were just that many years behind the Holstein Association. They have made wonderful strides during the last 10 or 15 years. The history of the past shows that there will be a wonderful increase in the future of the Guernsey breed,—and to tell the truth the balance is slightly in favor of the Guernsey considering the date of importation of seed stock, and therefore we should believe that the future of the Guernsey is even brighter than that of the Holstein Association at the present time.

I am glad to come to Vermont because it has a real active Association,—a State that is the home of the National Ayrshire Association and the National Holstein Association. I am particularly proud to find that the local Guernsey breeders have taken such a tremendous interest in the proposition of making a creditable showing at the dairy show.

I believe in the Guernsey; the history of the past convinces me that the future is bright and I want to congratulate every man who is in the Guernsey business now, and ask him to try to induce others who are in doubt, to go into the dairy business instead of any other business. Don't fear to tell others what the Guernsey cow has done in the past and tell them what her prospects are for the future. Agriculture is a noble profession; there is no nobler calling and live stock farming is the noblest calling in agriculture; and, finally, Guernsey breeding is the noblest calling in live stock farming.

JANUARY 14, WEDNESDAY FORENOON SESSION.**PRESIDENT'S ADDRESS.**

Fifty years ago last October, the Dairymen of Vermont were invited to meet at Montpelier to discuss the advisability of forming an organization of Vermont Farmers. The result of this meeting was the organization known to us as the Vermont Dairymen's Association. For the first few years a business meeting for the election of officers was held in October and a winter meeting where speaking and discussions on farm problems was in order, was held in January; for nine years these two meetings were held. At the tenth meeting, it was voted to change the constitution and thereafter hold only one meeting a year, that meeting to be held the second week in January and this law still holds. The first President was Mr. E. D. Mason of Richmond who was re-elected for a number of years, the first Secretary was Mr. O. S. Bliss of Georgia and he was in this position for eleven years. There were three Trustees from each County in the State, their duties were to further the interests of the Association and get new members. Fifty years is a long time for any organization to live and flourish and the men who founded this Dairymen's Association had a vision and exercised rare judgment and ability in shaping the affairs of the Association. From this small beginning the Association has grown to be recognized as the largest and most progressive Dairymen's Association in the east, if not in the United States. In the old days the subjects for discussion were largely Dairy Cows and the best methods of making butter, the exhibits were butter and cheese. Only twenty years ago we had over two hundred samples of butter sent in for scoring, last year there were about forty. This is proof that we are fast becoming a milk shipping State. I am told that at the present time over fifty percent of the milk received in Metropolitan Boston is from Vermont farms, probably a tenth as much is shipped from the west side of the State to help supply the New York Market.

Vermont farms are best adapted to dairying and whatever our personal feelings are in the matter, I believe the shipping of whole milk is to continue to increase until the greater part of the milk produced in the State will be sold as whole milk, certainly the milk made nearest the railroads

will be shipped and the Creameries farther back will be used as feeders or for the manufacture of commercial sweet cream. The time will come when Vermont will be an importer of butter, this will be determined somewhat by the amount of oleomargarine the farmers use in their own families.

It is natural that the Vermont farmers should be interested in the Dairy Cow and in her future; there was never a time when the dairymen could so ill afford to care for and feed unproductive cows as now, with the cost of grain around \$80.00 per ton and labor asking \$3.00 per day and found and when needed most, not to be found. Every cow in your stable must be a worker or you are bound to have an unprofitable business and a most unpleasant awakening at the end of the year when you balance your books. I wonder how many persons really keep books. If you remember only one thing I am saying may it be this: It is just as important that the farmer consider his farm, stock and equipment as a business and inventory that business each year, keeping a correct account of receipts and expenditures, know whether you have a business worth anything or not, whether it is worth continuing, and if not find the hole in that business and "plug" it as any other business man would do. Know your cows and keep only the best ones.

The Department of Agriculture for 1919 reports there was nearly 88,000,000 lbs. milk produced in this Country; 44% was used as whole milk, 36% as butter, 4½% as cheese, 4½% as canned milk, 4% as ice cream, 4% fed on the farm and 2½% loss in waste in the industry. During the late war the American exports of milk increased three times. In 1914, 70,000,000 lbs. milk left the United States. In the year 1919 the total was 2½ billion lbs. The 1914 shipments of 70 millions was nearly all butter and cheese. One half of the 1918 shipments was condensed milk. When the countries of Europe adjust themselves and the call for our dairy products begins to fall off, what are we to do with this immense quantity of milk? Think it over.

Our labor situation is yet unsolved. It is impossible for the farmer, who is obliged to rely on his farm receipts for the maintenance of himself and family, to compete with prices paid at the manufacturing centers. We cannot have the farmer work sixteen hours a day, to feed the laborer who is on an eight hour day basis. The boycott of labor and the return of the farm to a family production basis is surely a radical solution of the farm labor problem. It seems to be the idea of labor today to receive much and give as little

as possible in return. The industries are about all operating on an eight hour day basis, they demand still less hours and more pay, their demands so far nearly all have been granted with this result, higher prices for the necessities of life,—every one striking back at the farmer. We hear constantly about the appointment of this or that commission to “investigate” the farmers’ price of milk, with the idea in mind that he is profiteering and it is unnecessary to maintain the present price of his products. Have any one of you known a committee being appointed with the idea of reducing the prices of those things the farmer is obliged to buy? Every one is striking but the farmer, and I am inclined to think some of us are “striking twelve” to continue in the unappreciated business of farming; nevertheless, I am a firm believer in the ultimate success of the farmer, especially of the Vermont Dairy Farmer.

If you will pardon me I would like to quote from a speech of Mr. Munn, President of the American Jersey Cattle Club, delivered in New England a short time ago. Mr. Munn says, “This nation was born from an inspiration by the fireside of a farm and country home. The midnight ride of Paul Revere was an inspiration born where the shadows from the fireside danced on the walls in a country home. There has never been a national crisis when that patriotic spirit, engendered back there by the fireside of the home in the country, has not come forward with its might and saved the country. It is by that fireside, where there is gathered in the evening the father, mother and children, that the real substantial character is built, and where real love of country and respect for good are born, far more than in cities.”

Before closing I must pay a tribute to my fellow laborer Mr. Myron Adams, at one time President and for a great many years Treasurer of this Association, who was called from us during the past year. A man among men, a friend well worth having and of great worth. We shall miss him, but the mantle of his faithful service in this organization must fall on some worthy member. In closing let me say, I am convinced that this Dairymen’s Association started fifty years ago has before it now a long useful life. I thank you all for the loyal support and help I have received during the many years I have been one of your officers, and I would ask for the incoming officers the same support, and please remember that the success of this Association does not depend as much on the efficiency of its officers as upon the loyalty of its members. Again, I thank you.

ADDRESS OF MR. D. M. WALSH.

FOOD AND DRUG INSPECTOR, BUREAU OF CHEMISTRY, U. S.
DEPARTMENT OF AGRICULTURE.

Mr. President, Ladies and Gentlemen:

I am very glad that your President has told you that I am a Vermonter, for there are some things that I can say to you as a Vermonter that I might not feel it becoming to say as a Government official. I have always been exceedingly proud of the food products of our Green Mountain State and my experience as a food official has served to increase this pride in these products very much. Something of the fineness and delicacy of the limestone, and the strength and ruggedness of the granite of our native hills seems to find its way into these food products, and our fruits seem to me a little sweeter and better-flavored, and our grasses a little greener and richer, and our beeves and our fowls a little more nourishing and strengthening. Perhaps it is because I associate the memory of a boyhood appetite with these products that I think of them in this way, but always when I know I am eating Vermont Maple Sugar, or Vermont Butter, or Vermont Turkey there is an added zest to the feast. Indeed, I am tempted to paraphrase the lines of Omar and to wonder what our Vermont farmers buy one-half so precious as the things they sell.

The food products which the Maple Sugar Makers' Association and the Dairymen's Association are organized to promote are particularly typical of the Vermont farm products which I have mentioned. Upon the output of our Maple Sugar industry and our Dairy industry a good part of the fame of Vermont as a source of excellent food products rests. These products are rapidly coming to be recognized as real luxuries and I am glad to see, from the exhibits here at your Convention, that there seems to be a movement to market them in packages and in a form in keeping with their splendid merits. I personally, know of firms in Boston that are paying a premium of several cents a pound for the butter output of certain Vermont creameries whose managers have learned how to cater to the fancy trade, and I dare say that the manufacturers of Maple products who are putting them on the market in suitable

form are reaping a commensurate financial return. This return, I believe, will never be lacking when the natural excellence of our products is supplemented by skillful manufacturing methods and attractive market packages.

My particular mission in coming before your Convention today as a Food Official is to assist you, if I can, in your efforts to have your Maple products and your dairy products conform to the National Pure Food Law.

It will not be necessary for me to dwell especially upon the adulteration of Vermont Maple Sugar and Syrup, as I believe this adulteration is practically non-existent. I have not come across a prosecution under the National law against a Vermont farmer for shipping adulterated Maple Sugar or Syrup during the past ten years. When you consider the ease with which this product may be adulterated, either by insufficient evaporation or by adding cane or other sugars or syrup to it, this record is very commendable.

There is one respect, however, in which the Vermont farmers are not complying with the law in respect to the packing of Maple products and it is this point that I have come here in particular to emphasize. You are not, as a rule, declaring the net contents on your packages of Maple Sugar and Syrup. The Food and Drugs Act was amended on March 3, 1913, so as to require that "The quantity of contents, in all cases of food, if in package form, must be plainly and conspicuously marked, in terms of weight, measure, or numerical count, on the outside of the covering or container usually delivered to consumers".

It has been the policy of our Department to secure compliance with this requirement of the law by education and publicity, and ever since the Amendment was adopted we have been circularizing packers of food products and running articles in daily papers and trade journals to inform these interests of the law. In the case of large manufacturers, we have been almost uniformly successful in getting them to declare the quantity of contents on the packages of food which they put out. But in the case of growers of vegetables and farmers and small dealers generally who ship food in package form, we have not been so successful. There has, however, been a great improvement lately, but shippers of Maple products, particularly the farmers, have almost uniformly failed to declare the quantity of contents on their packages. We members of the Boston Station of the Bureau of Chemistry who have charge of the enforcement of the National Law in New England are greatly concerned about this, as we realize that now, after more than five years of propaganda work to inform the trade of the

law in respect to this matter, prosecutions of those who fail to comply with it may start at any time. We have sent circulars to all of the manufacturers of Maple Sugar and Syrup in Vermont that we could learn of, setting forth the requirements of the law in regard to declaration of quantity of contents and, as I said before, my particular mission here is to inform you of this matter.

You will note that the regulations require the quantity of contents to be stated on the outside of the covering or container of food in package form. The statement must be plain and conspicuous. Regulations further require that "Statement shall not be a part of, or obscured by, any legend or design, and shall be so placed and in such characters as to be readily seen and clearly legible when the size of the package and the circumstances under which it is ordinarily examined by purchasers or consumers is taken into consideration".

The regulations also require that "If the quantity of the contents be stated by weight or measure it shall be marked in terms of the largest unit in the package; for example, if the package contains a pound, or pounds, and a fraction of a pound, the contents shall be expressed in terms of pounds and fractions thereof; or pounds and ounces, and not merely in ounces". Other regulations are that "Statements of weight shall be in terms of avoirdupois pounds and ounces; statements of liquor measure shall be in terms of the United States gallon of 231 cubic inches and its customary subdivisions; i. e., in gallons, quarts, pints, or fluid ounces, and shall express the volume of the liquid at 68°F.", "The quantity of solids shall be stated in terms of weight and of liquids in terms of measure unless the package be marked by numerical count and such numerical count gives accurate information as to the quantity of food in the package".

Briefly, the law simply requires that you state the quantity of the contents on your Maple Sugar and Syrup packages plainly and conspicuously. In the case of liquids you should use gallons, quarts, pints and fluid ounces as units of measure and state the contents in terms of the largest unit in the package, as "One quart", or, in case the package does not contain an even unit, then in terms of the largest unit and the next smaller unit, as "One quart, four fluid ounces", or "one pound, four ounces" in the case of solids, or, if you prefer, you can declare the contents in terms of the largest unit and fractions thereof, as, "One and one-fourth pounds".

I realize how difficult it is going to be for farmers to

label their packages of Maple Syrup and Sugar as to quantity of contents. Most of the producers ship their product in naked tin cans without labels, labels do not readily adhere to tin cans, and there is always a rush and a scarcity of help in sugaring season. If preparations are made in advance, however, these difficulties should not be insuperable. My suggestion is that your Association arrange with the manufacturers who supply the cans for Maple Syrup and the pails for Maple Sugar to press a statement of the quantity of contents in the tin at the time these containers are made. As these products are usually shipped in packages holding one unit of measure, some such legend as "Net contents one quart" in the case of syrup or "Net contents one pound" in the case of sugar would be satisfactory.

If you adopt this suggestion I want to urge you to arrange with the Can Company to make your cans large enough. The law requires us to take the volume of liquid at 68°F, so that if a can is filled when the syrup is hot, and will hold only a gallon, there will be less than a gallon when the syrup cools to 68°F, as the syrup shrinks in volume on cooling. This should be allowed for in determining the size of can to use.

As to Dairy products. We have found some adulteration of Dairy products but the greater part of these adulterations are, I believe, due to carelessness rather than to an intent to deceive the consumer.

One of the forms of adulteration is low milk fat content in butter. Our standard for butter requires that it contain 82.5% of milk fat. We occasionally find butter running around 80% milk fat or less, due to having too much moisture or too much salt incorporated in it. You will readily see that if the moisture runs over 16% and the salt over 2% the milk fat content is bound to be low. The only remedy for this is a careful creamery man.

Another fault with butter is short weight. We are obliged by the net weight regulations of the National Pure Food Law to allow for "The ordinary and customary exposure of the packages to evaporation or to the absorption of water". But we occasionally find packages of butter on the market, particularly print butter, which are so short in weight that even the most generous allowances for evaporation will not account for the shrinkage. Some manufacturers endeavor to allow for shrinkage by declaring the net weight as "Sixteen ounces when packed". This form of declaring the net weight is not satisfactory because the Food and Drugs Act requires that the packages bear a statement of the quantity of contents at the time they are offered for

interstate shipment. Because of variations in weight which may occur before shipment, the statement of "Net weight when packed" is not necessarily a statement of the net weight when offered for shipment. Allowance should be made, when packing products which are liable to change in weight, so that the declaration of net weight will be true at the time the article is shipped or becomes subject to the operation of the law.

I believe that creamery men should exercise great care to see that their butter prints are in good order and not warped or shrunk so as to deliver less than full weight.

These are the points that I have wished to discuss with you—namely, declaring the quantity of contents on packages of Maple products, low milk fat in butter, and short weight in butter. If there are any other matters in regard to the relation of the National Pure Food Law to your industries on which I can inform you, I shall be glad to do so.

A MEMBER:—Is there any standard for the weight of Maple Syrup?

MR. WALSH:—Yes. The standard is eleven pounds to the gallon.

SECRETARY:—If we supply our members with labels bearing a printed declaration of net contents, with the exact amount in blank to be filled in by the member with pen and ink, will this be satisfactory?

MR. WALSH:—Yes, providing the member actually fills in the blank and the statement is plain and conspicuous.

A MEMBER:—If cans bear the legend "One quart", "One gallon", etc., pressed in the tin, would that be a satisfactory declaration and would you assume that to represent the quantity of contents?

MR. WALSH:—I do not think this form of declaration is the best one. I think that the words "Net weight" or "Net measure" or "Net contents" should also appear but I believe that if the words "One quart", etc., appear alone that would justify us in assuming them to convey the meaning that the package actually contains a quart, etc.

A MEMBER:—We receive a great deal of sugar from farmers, packed in miscellaneous pails, and, in turn, we ship this sugar to manufacturers to be prepared for market. It is not practicable for us to determine the net contents of these pails, so we sell by bulk to the manufacturers, deducting a certain percentage agreed upon for the weight of the pails. Do we have to put the net weight on these pails?

MR. WALSH:—The Bureau of Chemistry has recently had this question up with a Vermont dealer and at present

I believe the understanding is that sugar packed and sold as you state is not food in package form and need not bear a declaration of net weight.

A MEMBER:—Is there any chemical standard for Maple Sugar?

MR. WALSH:—The standard reads as follows: "Maple Sugar is the solid product resulting from the evaporation of Maple sap or Maple Syrup". You will note that no chemical limits are given in the standard. If you manufacture sugar from pure materials, you will have no trouble with the chemists, for we rely upon chemical analysis to determine adulterations of Maple Sugar and these analyses are based on data which have been secured by examining large numbers of samples of known Maple Sugars from different parts of the Maple Sugar territory.

APPOINTMENT OF COMMITTEE ON RESOLUTIONS.

BY THE PRESIDENT.

J. L. Hills, Chairman.

J. B. Candon.

C. A. Badger.

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APPOINTMENT OF COMMITTEE ON RESOLUTIONS.

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VALUE OF PURE BRED SIRES.

E. F. BURTON, DAIRY HUSBANDMAN, BUREAU OF ANIMAL
INDUSTRY, WASHINGTON, D. C.

Mr. President, Ladies and Gentlemen:—

The sires used determine the fundamental capacity of your stock to be profitable. The sire determines the capacity of your stock to be profitable, because the sire determines the market value in a large measure of the offspring of every female you own. The sire determines the capacity of your stock to be profitable, because the sire determines the breeding value of the offspring of every female. The sire determines what your herd will soon be. The sire determines the capacity of your stock to be profitable, because the sire is the most important factor in determining the returns you will secure from the feeds you feed your stock, provided the ration is a good one. The sires you use have much to do with the labor income you secure from your farm; determines whether your labor returns much or little. Sires have made our greatest herds what they are; they have made purebreds better than scrubs.

Some 25 years ago I saw for the first time a threshing machine. It seemed a wonderful thing to me but it does not compare at all favorably with our new improved makes that do not excite any wonderment. It was slow; it wasted grain; it broke down; it required a lot of power to do the work it did. With an increase in power of 40 to 50 per cent the new machine threshes almost as many thousands of bushels today as the old types threshed hundreds.

The poor cow is much like the old thresher. It takes her a long time to produce a little product and she is wasteful. She wastes labor; she wastes feed. What is worse, she does not enthruse you or arouse your pride.

The good cow is much like the improved thresher. As the improved thresher requires more power to operate so does the good cow require more feed to produce to her full capacity; but, as the increased power enables the improved thresher to thresh thousands of bushels of grain, where the old one threshed hundreds, so does the increased feed, given the good cow, yield many dollars of profit where the poor cow yields but a few.

As the mechanic has improved the thresher and made it more profitable so does the good purebred sire improve the poor cow or poor herd and make them more profitable. In both cases it is a matter of enlarging the capacity to be profitable. Sires give to their offspring the capacity to produce whether it be meat, milk, wool or work. The female cannot have such an influence as the sire because the sire has as much to do in determining the characteristics of the offspring of each female in the herd as any particular female may have in determining the characteristics of her own progeny.

If we measure the value of a cow producing 200 pounds of butterfat yearly, and one producing 400 pounds of butterfat annually, in terms of economy of production, it is clear why high production is desirable. I shall use round numbers. The two cows will use the same amounts of feed to maintain their bodies. The difference in the feed required is the difference in amounts of feed required in production. Stated in figure we have 6,200 pounds of digestible nutrients needed by the 200 pound cow and 9,400 pounds for the 400 pound cow. In order to produce 400 pounds of butterfat with the 200 pound cow, two cows instead of one must be used and 12,400 pounds of digestible nutrients must be provided instead of 9,400; a difference in favor of the good cow of 3,000 pounds of digestible nutrients. You dairymen cannot ignore these facts if you meet successfully conditions that are certain to prevail in the near future.

I have been making a study of your cow testing associations' records. I have compared the results you are getting with the results the men in other States are realizing. I find you do not compare very favorably with the other States nor with the average production of all the associations studied in the United States. While the figures at hand are not conclusive it would seem that your associations indicate the lowest production of any State in New England. The average production in your associations this year is about 205 pounds of butterfat. The average for 110 associations in the entire United States is 247 pounds of butterfat. If our figures apply it would be very profitable for you to increase your cows' production to the average of the United States. To do this would increase the returns from the feed you feed 10.6 per cent. If you raised the average production of the cows in your associations to the average of the associations in the United States you should realize \$15 per cow more income above the cost of feed than you do now. That would mean much to you.

I have just been checking over records of an associa-

tion not far from here and I noted 11 herds that showed an average return for product sold ranging from \$5.00 to \$122.00 less than the feed fed had cost. In December six of these herds again showed a similar loss. One herd showed a loss of \$122.00 but one showed a profit of \$88.00. This tells a big story but what is it?

I do not believe that the sires used in the past were the sole cause of this great difference but the sires have likely had much to do with it. It does seem clear to me that dairying in Vermont can not long be maintained upon this basis even under present conditions, which it would seem can not long last.

A short time ago a representative of the Australian Department of Agriculture was in the office. He stated that the dairymen in Australia were realizing but 28 to 30 cents per pound for their butterfat. Later one of the leading dairymen of Denmark was in the office. He said that the dairy countries of Europe have not suffered great losses of dairy cattle but as soon as shipping lines are opened the dairy business would flourish. Already Danish butter has reached New York. Our exports of dairy products will soon be stopped it would seem and instead there will be imports. The reason for this is shown in the chart upon the wall. You note how much more human food is produced by the dairy cow than any other animal from a given amount of feed. We may put it this way: when a nation's money becomes a low value, that nation exports dairy products, for in this way they can get more for their crops. Under such conditions cheese is most likely to be given prominence among the exports.

Our money is of high value compared with Europe's. Their dairy industry has not been greatly impaired. Ours has because of a shortage of labor and its cost. It seems inevitable to me that dairy products will flow into this country from other countries.

You can not hope to increase your profits by increasing the cost to the consumer even though no imports come to us. Dr. Gilbert, of the Boston Chamber of Commerce, states that this is true on the Boston market. Canned milk from the West is being used in large quantities. Powdered milk is opening up a wide field and is finding many new uses.

The West with its cheaper feeds is going to constantly threaten your market. The West already dominates your butter and cheese market and you must keep your price to the consumer down or it will dominate your milk market. This is an economic condition and it will do no good to complain. I am telling you these things not for the purpose of

"knocking" or to give praise. I want to give you a picture of the actual situation. I want you to see these things as others see them. What shall be done to meet these issues?

The sires you use determine the fundamental capacity of your cows to be profitable. Farm management studies of many States and those of the Department of Agriculture show in an unmistakable way that this statement is true. There is no factor except the farmer's ability as a manager that has so much effect on the profits made from live stock as the sires used.

There are three kinds of sires. One kind decrease the production; decrease the value of the herd. These are scrubs. The second kind have apparently no effect on the production of offspring. The females decide this. These are "neutrals". Then there is the third kind, that seem to dominate the results secured completely. The daughters of these bulls are better than their dams. These are the sires that the breeder must have. This sort of sire makes men wealthy if their owners know how to make use of them. This type of sire builds the ladder to success.

Now there are lots of the first type to be found. Scrubs are found everywhere one goes. The "neutrals" are not so bad but this depends upon your herd. Possibly there are in every one hundred pure bred bulls born in the dairy breeds fifteen that will be outstanding sires, what you are looking for. Which are these good bulls? I don't know and there is no way to know until they have been tried out. It is safe to say that they are found in every family of every dairy breed and often when they are found they are dead. Neither pedigree nor records are certain guides in selecting them. They help a lot. The better the pedigree and the more and the better the records there are back of an animal the less the chances are that a bull will be a poor one.

Dairymen do not value a tried sire highly enough. I met a man in West Virginia last summer who had a Jersey bull of St. Lambert's breeding that was bred by a leading breeder of Pennsylvania. This bull's daughters as two year olds were very good ones. They were, it would seem, able to produce about 75 pounds more fat than their mothers and their mothers were the highest producing cows in the cow testing association. This bull was for sale at \$100, less than the the butcher would pay for him but nobody wanted this sire because his pedigree was not just right. Shall we select sires by performance or by pedigree?

Our answer to this is made after long experience and studies of the breeding of dairy cattle. We feel that we can say select tried sires without a doubt that we are right.

We must all come to recognize this too. We must stop the loss of so many valuable sires that mean so much to our dairymen. Of course, we want good type. The bull association will do this. The bull association not only provides a means of trying out and retaining the good sires and discarding the poor ones, but it will reduce the cost of securing the services of purebred sires.

We have had men who have worked with bull associations ever since they were first organized in this country. They have studied them from every angle and now we are ready to say there is no inherent weakness in the plan. It is practical. It is certain to secure for you the results you are looking for in improving your herd. The bull association becomes a permanent institution in a community. You may drop out but some one else takes your place. The association lives on and provides tried sires for your sons and their sons, making their success more certain.

What sort of organization is necessary to do these things? How is a bull association organized?

One or more men located in three or more communities, it does not matter how many, raises enough money to buy a bull for each group, as good a bull as it is possible to buy and the officers of the association buy the bulls for the association. The bulls become the property of the association and are not the property of any individual or group of individuals. After each bull has been used two years the bulls are changed about. You may now own good sires. If so use the sires you now have. In some cases there is just one man in the association who uses an association bull. In other cases as many as sixty men use four bulls.

In New Windsor, Maryland, there are eight bulls and one man only uses a bull. In this case there is no difference in being a member of a bull association or not and owning your own bull except that the men have agreed to exchange sires with their neighbors. This New Windsor association has been organized nearly eight years. The average cost per member was but \$143.00 for the whole period of seven years and there has been considerable loss due to various causes. There were five bulls disposed of during this time at a loss. These men have had the use of good tried sires for eight years at a cost less than the price of one bull. That is good businesslike economy, for other wise they would have had to purchase four bulls in this time.

These men have found that the daughters of their bulls are much better than their mothers. The increased production of the daughters of one bull figured at a price of sixty cents per pound butterfat amounts to \$1,000.00 in

four years' time. This gives you an idea how fast the sire may increase your income. It gives you an idea also how much loss a sire may cause you if he is a poor one.

The bull association has meant much to South Carolina. There are nine associations down there and it would seem that these organizations are doing much to start the dairy business in a profitable way in the South.

The Rowan association affords an illustration of what is being done by men who are members of a bull association. Not long ago a New York Guernsey breeder wanted a sire to follow his herd sire. After looking around he became interested in one of the bulls in the Rowan bull association. He offered the men \$15,000 for the bull but through the county agent's influence the men decided not to sell so the New York breeder offered the men the use of his herd sire; he gave them two young bulls; he agreed to pay express charges both ways and all other costs of making the change; he insured the association bull for \$7,500 and he is to pay \$1,000 cash besides for the use of this proved bull association sire for two years' use. That is a big price but it is justified.

Some day men will not pay big prices for untried sires. They will pay big prices for membership in bull associations so that they can have the used of tried sires, sires that men like you have made worth fortunes just by proving their worth.

In West Virginia I found a good illustration of what happens to many a good sire. A man there purchased a young calf in St. Louis for \$150. The express to West Virginia was \$21.50. The bull was turned out with the cows. He soon became troublesome and so the owner gave a neighbor the use of the bull for the cost of his keep. Soon afterward the owner sold his farm and he gave the bull outright to the man who had been keeping him. Shortly this man sold the bull to his son-in-law for \$21.50. While the son-in-law owned him the bull sired some of the best cows in the neighborhood. Four of these daughters at ten years of age and older produced over 400 lbs. of fat and they were from scrub cows. The bull was soon sold to the butcher. How many of you men have had a similar experience? Contrast the story of the sire just mentioned with the one the New York breeder got from the Rowan bull association and you see the value of a bull association.

Our figures show that the production of the cows in cow testing associations in your State has decreased every year for three years. This cannot go on and permit you to meet the competition of the West where they are securing much

larger production on much cheaper feeds and are making upwards of fifty per cent more profit from their cows than you are realizing. You must have better cows. You must feed your cows wisely. Breeding and feeding cannot be separated. They go together.

You can meet these problems. You can solve them. There is little that you men of America cannot do if you set your mind to solving the problem you tackle. If you want good cows; if you want high producing herds; if you want good sires, I know you can and will get them. Let us get busy and do these things. I thank you.

WEDNESDAY AFTERNOON SESSION.

HOME GROWN ROUGHAGE AND HOME GROWN GRAIN.

BY E. S. SAVAGE, PROF. OF ANIMAL HUSBANDRY, CORNELL UNIVERSITY.

The daily requirements of a cow weighing 1,100 pounds and giving 35 pounds of milk, testing 3.5% butterfat, are 19.78 pounds of total digestible nutrients of which 2.91 pounds must be digestible protein. Ten pounds of a good grain mixture containing 20% total protein with 12 pounds of red clover hay and 35 pounds of corn silage will fully meet the daily requirements of this cow.

I wish to follow this out a little bit further and show as definitely as possible the influence that good roughage can have on the cost of the grain mixture. Then second, I wish to show the influence that good roughage when coupled up with home grown grains can have on the cost of the grain mixture. For home grown grain we will consider a mixture of peas, oats and barley.

TIMOTHY HAY RATION.

To furnish the necessary amount and kind of nutrients to feed the cow noted above for twenty-four hours, would require the following ration if the hay were timothy hay. I consider that timothy hay is about the poorest roughage that can possibly be fed to dairy cows. I think it has little value over oat straw for this purpose.

TIMOTHY HAY RATION.

	Dig. Protein.	Total Dig. Nutrients.
12 lbs. Timothy hay,	.36	5.82
36 lbs. Corn silage,	.39	6.20
2 lbs. Wheat bran,	.25	1.22
1 lb. Ground oats,	.10	.70
1 lb. Hominy,	.07	.85
2 lbs. Oil Meal,	.60	1.56
2 lbs. Gluten feed,	.43	1.61
2 lbs. Cottonseed meal,	.63	1.50
	2.83	19.46

Ten pounds of the grain mixture indicated with timothy hay and corn silage would cost at retail about \$3.85 per 100 pounds, or \$76.90 per ton. It will be noted that in order to get the proper amount of protein in the ration that 6 pounds of high protein feed out of 10 are needed. Such a grain mixture would be equivalent to a ready manufactured ration, which would need to guarantee 25% protein, 6% fat and not to exceed 9% fiber. We will now see what changes we could make in this grain mixture if we had a good roughage.

CLOVER HAY RATION.

To feed the same cow with clover hay as a roughage, we would need to use the following ration:—

CLOVER HAY RATION.

	Dig. Protein.	Total Dig. Nutrients.
12 lbs. Clover hay,	.91	6.12
35 lbs. Corn silage,	.39	6.20
2 lbs. Wheat bran,	.25	1.22
1 lb. Ground oats,	.10	.70
3 lbs. Hominy,	.21	2.54
2 lbs. Oil meal,	.60	1.56
2 lbs. Gluten feed,	.43	1.61
	2.89	19.95

The changes that have been made in this ration as compared with the timothy hay ration are these. The cottonseed meal can be cut out and two more pounds of hominy used in its place, that is, on account of the higher amount of the digestible protein in the clover hay less of the costly high protein grains needs to be purchased, and in its place we can use a low protein grain. In making these changes I have not tried to get the greatest contrast, for in taking out the cottonseed meal instead of the oil meal, I have taken out a less expensive ingredient. A still greater contrast between the poor roughage and the good roughage could have been made by taking out the oil meal and leaving the cottonseed meal in.

Ten pounds of this mixture necessary with clover hay would cost about \$3.68 per 100 pounds or \$73.60 per ton. This mixture would contain about 20% total protein and a comparable manufactured feed would need to guarantee 20%

protein, 5.5% fat and 9% fiber. Therefore, it can be seen that the 20% manufactured feeds do not contain enough protein unless the roughage is good, and if very poor roughage is fed a feed must contain as much as 25% protein as is illustrated by the mixture necessary with the timothy hay.

The contrast between the cost of the grain mixtures shows very well, it seems to me, the mistakes those farmers are making who do not have good clover hay or alfalfa hay for feeding their milk producing cows.

CLOVER HAY, PEAS, OATS AND BARLEY.

In calculating this ration it is assumed that we would have enough peas, oats and barley to make up one-half the grain mixture, and that in this mixture we would get 1 pound of peas to every 4 pounds of oats and barley. In checking up with farmers on this who have grown peas, oats and barley, they assure me that this amount of peas could be obtained by using the following seed ration: 7 pecks of oats, 3 pecks of barley, 1 peck of peas per acre.

A ration to show the mixture fed with clover hay would be as follows:—

CLOVER HAY, PEAS, OATS AND BARLEY.

	Dig. Protein.	Total Dig. Nutrients.
12 lbs. Clover hay,	.91	6.12
35 lbs. Corn silage,	.39	6.20
2 lbs. Oats,	.19	1.41
2 lbs. Barley,	.18	1.59
1 lb. Peas,	.19	.76
2 lbs. Wheat bran,	.25	1.22
2 lbs. Gluten feed,	.43	1.61
1 lb. Oil meal,	.30	.78
	2.84	19.69

A study of the grain mixture shown in this ration will make it plain that only 3 pounds of high protein feed with 2 pounds of wheat bran need to be purchased if one has a good supply of peas, oats and barley. The wheat bran could be dispensed with and 7 pounds of peas, oats and barley could be fed with the gluten feed and oil meal to good advantage, although, the mixture might be a little heavy. The price that is assumed in working out the cost for peas, oats and barley ground together is \$3.60 per 100 pounds, which is

about the retail price of corn meal. It seems to me that a farmer should be well satisfied with the returns per acre if he got as much for ground peas, oats and barley per pound as he could get on the market for corn meal.

Ten pounds of the grain mixture using peas, oats and barley to make up one-half of it would cost \$3.58 per 100 pounds or \$71.60 per ton. By comparing this with the timothy hay ration, you can see how much one would be able to save. Also it is shown that some saving could be made even between the clover hay ration and this ration, made up of clover hay, corn silage and one-half home grain supplemented with proper purchased concentrates, and one would have the further pleasure of using his home grown grain.

The difference in cost between 100 pounds of the grain mixture fed with timothy hay and 100 pounds of the grain mixture fed with clover hay when home grown feed is used is 27 cents. When one saves 10 cents on a bag of feed, he raises the price of 100 pounds of milk for himself 3 cents a hundred pounds due to the fact that it takes 1 pound of feed to make 3 pounds of milk. Therefore, this saving between timothy hay ration and a ration using home grown clover hay and home grown peas, oats and barley would be equivalent to a raise of 9 cents per 100 pounds of milk.

To sum up and show the contrast, the following table is made to show the cost of 100 pounds of each grain mixture:—

Grain mixture with timothy hay would cost at retail,	\$3.85
Grain mixture with clover hay would cost at retail,	3.68
Grain mixture with clover hay, peas, oats and barley would cost at retail,	3.58

The further fact must be emphasized that with the latter ration one would have the pleasure of paying himself \$3.60 per 100 pounds for his grain mixture according to the cost of corn meal as given in the table above.

All this is written at this time of year in order to emphasize the influence of roughage and the influence of home grown grain. I hope that some of you Dairymen's Association members will think this over and make your spring plans accordingly.

This gives us another opportunity to make some comparison with manufactured feeds. In working out the cost of all of these rations, I have added \$5.00 a ton to the wholesale price. This addition of \$5.00 is to cover the retail selling cost, and is ample. I will not make direct comparisons with any manufactured feeds, but I will guarantee that the mixture suggested with timothy hay will stand up beside

any 25% protein ready mixed feed on the market. The mixture suggested with clover hay will stand up against any 20% protein ready mixed feed on the market, and I am sure that the mixture containing the peas, oats and barley will stand up against any 20% protein feed on the market. Just contrast for yourselves the prices indicated by these mixtures as compared with what you have to pay for ready mixed feeds of the same type and see if you are not paying a good round sum for mixing.

MILK PRODUCTION AND CONSUMPTION.

PROF. GEO. F. E. STOREY, WORCESTER COUNTY FARM BUREAU.

In discussing a subject as broad as that of milk production and consumption, one must arbitrarily begin at some point. I think the older breeders in the audience will admit that there is no better place to start than with the herd sire. Now that dairy cattle are becoming much higher in price and the cost of raising heifers well-nigh prohibitive, under many conditions it behooves us to see that our stock is well-bred.

To my mind, no better investment can be made, even on the ordinary milk farm where grade stock is maintained, than the purchase of a pure-bred sire of good individuality and from a long line of high producing ancestors. Beef at the present time is so high in price that in many cases the present scrub sire, which is being held in the herd, could be traded for a pure-bred calf of merit and by so doing a great gain would result without any immediate cash outlay. In fact, I have before me at the present time a statement from several breeders to the effect that they will gladly exchange sires from high producing stock for grade bulls, if the owner will guarantee to maintain them in a thrifty condition and give them the first choice when they desire to sell the animal. Nothing gives me greater satisfaction than to talk with friends who have been persuaded to buy bulls of merit and after two or three years' experience with the offspring of such crosses, to hear their words of commendation for the principles of better breeding.

To be sure, it is not enough to have only a good sire. The cows should be of good type and good producers, for the sire can never be the whole herd and in many cases breeders have been disappointed in results when they have expected a good bull to completely dominate a bunch of ill-shapen, low-producing cows. Having a well-bred calf, the next point to consider is to see that they are well grown. It is desirable that young stock should at all times have plenty of roughage, water, and exercise, preferably in the open air. It is not as important to have heifers fat at all stages, as to have them growthy, as it has been proven time and again, that stock of vigorous type will in after years lay on flesh and assimilate grain just as efficiently as a calf that has been

heavily grained from birth. Most of our breeders are coming to realize that unless the calf has been exceptionally well-grown, it is better to have them from twenty-seven to thirty months of age before they freshen. At this time they will have gotten their growth and should occasion demand they are of good size and may be easily disposed of on the general market.

The next point to consider is proper feeding of mature cows for milk production. It is not enough that animals be fed all they will eat, for it has been shown time and again that animals may be fed so much of poorly selected feed and at such frequent intervals, that in many cases a decided increase in the amount of milk yield will be noted if the feed is reduced in amount and changed in make-up. The so-called balanced rations which are on the market and which may be mixed up from separate grains are merely an endeavor to supplement hay and silage in such a way that the cow will receive sufficient protein, carbohydrates, fat and mineral matter in a day so that she can not only maintain her body weight, but produce the maximum amount of milk. The extensive experiments which have been carried on at the University of Vermont indicate that many of our farmers have been inclined to use too high a percentage of protein in the grain mixture, and it is doubtful if over 20% of protein can be fed in the grain mixture over a long period of time without seriously affecting the life and condition of the cow. I use this statement advisedly as in some of our southern states a very large amount of cotton seed is fed where cows are in a way accustomed to its effects. A similar amount fed to our cattle would produce no end of udder trouble. This suggestion is borne out by the practice of some of the best cattle men in the country at the present time. I have been in many stables where from fifty to one hundred head were maintained, under all conditions as regarding help, etc., and the wise feeders are almost universally selecting rations carrying a lower protein content. There are many things which influence the ration which may be fed with profit, such as the character of the home-grown feeds available, market price on so-called standard grains, distance from the station, necessity of getting as much fertility as possible in the grain rations, and many other points. A full discussion of ration building can be gotten from your state Extension Service so that no further discussion will be given at this time.

There are many other principles of herd management which we can properly consider at this time, such as the careful recording of breeding records, milk yields, buying

in quantity at a period of the year when feeds are generally cheaper than at other times, and the disposal of inferior stock. All of these points are more or less important, and go to make up a successful dairy proposition. Many men, at the present time, owing to the high price of feeds, are maintaining their same number of stock, but feeding them small amounts of grain. This I believe is an unfortunate condition, as it not only prevents the cow from doing her best work, but the chances are that a great deal of feed is practically wasted. The time has come when we must very carefully consider all phases of the industry in order to make a reasonable profit.

Probably one of the most important factors governing profits from the dairy business has been a lack of real understanding of the merits of dairy product as food. We have worked like slaves to produce a large amount of milk and other products and have hoped to goodness that somebody would buy them. With an industry reaching well over two billions of dollars during the past year, practically nothing was spent in advertising the business. To my mind, this was a grave mistake, and it shows the inherent soundness of the industry when such a condition can exist. Last summer we had a considerable surplus of milk on the Worcester market, and during the month of June attempted by means of posters, placards, newspaper articles, exhibits in factories, schools, stores, etc., moving pictures films and newspaper articles to bring about a greater consumption of milk and other dairy products. The results were extremely satisfactory and resulted in a decided increase in consumption, of milk. Factories that had formerly sold "tonic" and coffee to their employees in the mid-morning and afternoon, placed milk on the carts and soon the men were using from two to three thousand bottles daily. This is absolutely new trade traceable entirely to the campaign which we had been carrying on. A little later we brought in Cho-Cho, the Health Clown, to talk to the children. He reached 15,000 children in the various schools of the city, and as a result of his talk, the milk consumption in private families increased between three and four thousand quarts. It is interesting to note that this demand has continued even throughout the winter. People actually want milk because they realize better than ever its wonderful food value. Where formerly a man would walk into a restaurant and ask for a glass of milk, taking it from the counter rather sheepishly, he now goes in and asks for a glass of milk and ten to one his neighbor will say "Make mine milk also." Thousands of quarts are being consumed daily in restaurants

that formerly served coffee and tea almost entirely. The same principle must be employed in dairy products as has boosted the citrus industry to its present high standing. If people realize the value of dairy products, have confidence that the price charged for them is not excessive, there is every reason to believe that we can even now double the consumption of dairy products.

COOPERATIVE CREAMERIES.

F. A. EDWARDS, RICHMOND, VERMONT.

Ladies and Gentlemen:—

You have just listened to two very interesting talks on the production and consumption of milk. Milk is one of the principal products in the State of Vermont; in our section of the State it is a fact that 80c of each dollar of the farmers' money is made from the dairy cow. I might go a little further than the two gentlemen who have just spoken, in making the statement that a few years ago, according to Dean Davenport of Illinois Agricultural College, we had about one cow to each family in the United States,—or about 23,000,000 cows. The average production of the cows in the United States is a little over 4,000 pounds; in Vermont we run about 5,000 pounds, as an average. If the average cow produces 5,000 pounds of milk and the farmers would spend perhaps 1c or 2c a hundred in advertising and conducting their business of handling their milk on a business basis, the State of Vermont would be the richest State in the Union, because you could not begin to produce enough milk to feed the people even if you doubled the number of cattle. It is just as necessary that butter and cheese be advertised as it is that you should advertise milk because the value of your milk is based on the products that are made from it; the greatest consumer of milk today is the manufactured product and the manufactured product is going to control the prices until you get people to using the milk that is made into butter and cheese. These 23,000,000 cows in the United States produce enough milk in a year, according to Dean Davenport's statement, to load a solid wagon train reaching seven times around the world. It takes the labor of enough men to milk those cows in one day to equal the labor of one man working eight hours a day for 1,200 years,—this also is one of Dean Davenport's statements, and he is one of the best authorities on this matter in the country. When you consider the amount of milk that is produced by the cows and the amount of labor that is required just for milking, if those things were advertised do you suppose that man that was getting 17c a quart would continue it? I think he would not.

There has been quite a lot said in regard to the surplus milk proposition. The surplus of milk is the one big factor now before the people throughout the country and the surplus of milk always will be a big factor until we advertise more thoroughly the products that are made from milk, and bring them before the public, as we should do. At the present time most of the surplus milk is being made up by the independent dealers and a few cooperative creameries are doing it, and it is then being stored in cold storages and put back on the market at a pretty good profit. Practically all the surplus milk we had at Richmond in the summer was made into butter and cheese, put into storage (the farmers using all they wanted of it) and our price for butter was 64c. These past few days brought us more for the fat alone in our whole milk than the marketing of milk in May and June.

I want to call to a few figures your attention. A quart of milk selling for 17c is what is usually shipped as 3.80 milk,—that is 3.8 fat in each 100 pounds; 100 pounds of milk has 46½ quarts; for 100 pounds of milk today,—the fat in it,—most of the creameries are paying around 80c. The fat alone in this 3.80 milk is sold for \$3.04, most of them paying around \$4.00 for that milk, and the skimmed milk is sold for \$1.00. In a quart of milk that a man pays 17c for you have 1.46 of 3.8 pounds, that is a little over 8 to the pound. Still you go into houses in the city or into houses here,—I have had farmers come into our creamery and say "We can't drink skimmed milk, it is too thin!". If some of these people could only find out how to take the fat out of the milk and not destroy its original strength, they would be doing a good work. In a quart of milk they are looking for the cream line down near the bottom.

Why is it that farmers a few years ago set the real value of the fat in milk only from 10c to 15c and now have put it around a dollar? If the farmers would do the thing they ought to do, they would be selling butter around 65c to 70c retail and also be getting the real value of the milk.

Our trouble is, we are not working in harmony and are not putting things on a good business basis.

I don't know how I happened to get into the creamery business, only that I had done a considerable business for Swift and Company in the western states in the way of buying butter and cheese for them and finally I came back home and went to farming. Three or four years after that, several of us got together in Richmond and talked about cooperative creameries. At first we were laughed at and finally the fellows found out our figures were right and they

decided that the farmers could work together as well as the fellows of the city.

The place to make the manufactured product is back here where it is produced; we need to make it right near its source of production. That is the way we figured in Richmond. Some people think that because we have been successful in Richmond in a measure it has been because somebody has been able to go down to the market and get a price for the products that nobody else could get. You can't do that; you can't go down there and charge the dealers in milk any more than anybody else. To succeed you have got to watch all the little things every day. I try to have every creamery I am connected with put a report on my desk so I can tell exactly what has been done that day. Every 15 days we make up a report that balances our whole account. Every month we have a financial statement that tells us whether we are ahead a dollar or behind a dollar; so we can see what is paid for fuel and labor and every other item of expense. For the last two or three years there have been thousands and hundreds of thousands of dollars spent in Vermont in erecting buildings or remodeling buildings in this cooperative movement. These same cooperative creameries have been the means of advancing the price of milk in conjunction with the Dairymen's League or N. E. M. P. A. from 10c to 15c per hundred. The reason most of these creameries have been closed is on account of unfair competition and incompetent management. I was talking yesterday with a man well known in this section about the milk proposition; he is interested in two or three different business propositions as well as the milk business. He can't do that successfully; he knows he can't; something has got to fail, because there is no man big enough to run the milk business and two or three other kinds of business and run them all successfully.

When we first started in Richmond you could ship a carload of milk from Sherbrook, Canada, to Boston (right through Richmond) at 1,800.00 a year, and the price was \$2,400.00 from Richmond for the same carload, only about half the distance. Why was that? I never did know why it was but those were the conditions. Those things have been changed and now we have just as good a chance to ship milk from Richmond or any other place that is the same distance and the price is equalized on the distance from the market, as it should be.

We have had some talk in this State of forming a federation of the cooperative creameries. Perhaps there has been some misunderstanding about it but I have felt for the

last year and a half or two years that unless we had some kind of a federation between the cooperative creameries to keep them working together we were going to have trouble. I didn't have any fear of the competition we were up against. We were right there in the territory of Borden's Condensed Milk Company but I had no fear of them or of any other dealers, because I knew we could operate that plant as economically as anyone else could and as long as we knew what we were doing at our end we were all right, because we could find enough people to buy our product at the other end.

There are several cooperative creameries throughout the State that are being operated along several different kinds of lines; some of them are going to ship milk, some make butter and some ship cream and some make cheese. There is no reason why they should all be working separately. For instance, if they want to have an auditor check up the books to see they are properly kept why not have a good auditor that will take care of all the creameries and thus cut down the expense? Now in the manufacturing line; I was talking with the man who sells our butter and he was telling me of different plants that shipped in butter this week that was mottled. Why did they ship it? Because they did not have a person who knew his business to keep them up to the standard and see that the butter was properly made. In the creamery work we want somebody to go around to each creamery in the different sections and take care of as many creameries as he can. See that every pound of butter that is made is the best butter and that it is uniform and that it is something that the consumer wants.

We have not been advertising our milk on a business basis. This is a thing you should know,—you can't live on fat. If we were to be locked into this room and somebody said, "We are going to give you the choice of two things to live on,—what will it be, butter or cheese, the cheese to be made out of skim milk?" I would say, "My choice is cheese". You could live if you kept exercising on skim milk and water for six months but you couldn't live six weeks on butter. Don't you see the chance we have got to put butter where the ordinary people can eat it and put skim milk at a price so that the consumer can live on it and at a reasonable figure? We must advertise our wares; we must put these propositions before the dealers and before the consumers in order that they may know what the product is worth. When you are paying \$73.00 a ton for grain and selling whole milk at the price you now sell it at you are not getting very fat.

I am in hopes the creameries that have already started

or are about to start will form some kind of a federation, so they can have some man as a salesman, some man for the manufacturing end of the business and some man as an auditor,—a specialist for each position, to keep each creamery up to a high standard of excellence. There is no other way that the business can be run successfully. It would not take over 2% on the average sales a year to pay the whole proposition and money can be made out of it.

Just a word in regard to the construction of the buildings; the creameries that have been built have not been designed for efficiency. Handling milk every day is an expense and a big proposition. It takes three mighty good men at the receiving room to take in 12,000 pounds of milk an hour and where you are shipping milk you have got to get it in by 11:00 o'clock,—you can't get the farmers there much before half past 6:00,—and you have only a few hours in which to do your work. There are many receiving rooms that give a lot of trouble, because they are not constructed properly. There are many ideas as to construction,—I am not going to tell you what they are, but figure the thing out and construct your receiving room so that you can do the work to the greatest advantage.

I believe if the farmers will become interested in co-operative creameries and handling them on a business basis thru' an efficient organization it is possible to double the value of the State of Vermont agriculturally and do it within the next ten years.

WEDNESDAY EVENING SESSION.

OUR STATE INSTITUTIONS.

GOVERNOR PERCIVAL W. CLEMENT.

The last legislature appropriated \$2,154,920 to pay State expenses for the year beginning July 1, 1919 and ending July 1, 1920. There are 86 different appropriations. It would be impossible to explain to you all of the different activities of the State, even though I should touch lightly on each one. To cover everything would take a month's time even if I should speak one hour a day. Your Commissioner of Agriculture has, I think, told you in detail the working of his Department. It is one of the departments which requires a large appropriation for, the Department itself including Forestry, Control of Plant diseases, and the "Farms for Sale" Book, there are appropriations totalling \$58,500. Then there is an appropriation of \$100,000 for the Eradication of Tuberculosis in Cattle and \$38,000 for the Vail School of Agriculture and the Agricultural School at Randolph. All of this makes a total of over \$200,000,—very largely devoted to the benefits of agriculture; and this does not include all of the activities of the State for the benefit of farmers, for you are familiar with the Department of Home Economics in connection therewith to which the state contributes a large part of the expense, something over \$50,000.

A good many people do not realize the degree in which the department of agriculture comes in contact with the business of the dairymen. For instance, the three creamery inspectors in the three districts in the State are supposed to give five days in each year to each plant in the State. They test your milk product for dirt, acid, butter fat, etc., suggest improvements, and in case of necessity visit dairies. They can embargo your product and thus raise the standard of creamery products. This gives the department general police power over the sanitation of creameries and dairies, and has already had a most important effect on the quality of milk.

The Commissioner of Agriculture will tell you of his plans and hopes with regard to the Eradication of Tuberculosis in Cattle. I will not undertake to discuss this sub-

ject except to emphasize the necessity which exists for the extermination of this disease.

FORESTRY.

Owing to heavy State expenses, no investment in forestry lands has been made this year. We have about 20,000 acres in the highest state of efficiency, so far as growing timber is concerned and we have a Nursery at Burlington producing about 750,000 seedlings of Red Pine, Scotch Pine and Norway Spruce. We are fast reaching the vanishing point of timber, and we are not replacing it. I wish to impress upon you the importance and possibility of enhancing the value of your farm properties by re-foresting such areas as are not profitable for other purposes. Farmers can get seedlings at cost and advice and service, free.

HIGHWAY DEPARTMENT.

During the year 1919, there have been 100 miles of road re-surfaced and improved, costing approximately \$400,000. We have under way eight projects for road building in which the State is to receive Federal aid. The total amount of these projects is \$297,000. There has been done \$63,000 worth of work on them; they will be finished in the spring. The delay in this work was owing to the delay in receiving trucks and other road machinery, from the Federal Government and the inability of the Department to make suitable contracts. It was almost impossible last spring to engage men or buy material.

In considering the building of roads, where Federal aid is expected, it is necessary to examine all bridges and many of them have to be rebuilt to meet the conditions of heavy travel which exist today. The Department has also spent about \$140,000 for maintenance and \$200,000 for re-surfacing. The patrol work has cost during the last year, \$269,000 of which amount \$67,000 has been paid by the towns and \$202,000 by the State. Early in the year, the Federal Government notified the Highway Department that cars and trucks and some other machinery suitable for road construction would be turned over to the State for that purpose. During the late summer and fall, we have received about 100 trucks and a few other pieces of machinery. Most of these trucks are in good condition and will be available for road work during the coming season. The result of their operation should be advantageous to the State and

give us a large increase in the amount of work done the end of next season,—the total value is about \$500,000.

DEPARTMENT OF EDUCATION.

Is one wherein a very large amount of money is annually expended. It would take the Commissioner of Education himself, to explain to you the thousand and one problems which come before his Department. I will only say that the effort of the Department to establish Junior High Schools is meeting with success and approval. The Department is also undertaking to restore the rural schools,—this is a most important move in the right direction as I believe and I hope that the result of its effort will be to rehabilitate to some extent, at least, the old red-school-house.

STATE INSTITUTIONS.

All the institutions which are operated by the State will always be a matter of interest to you. I wish that more of you would take occasion to visit the institutions and see for yourselves how affairs are conducted. The State Prison at Windsor contains about 167 men and 19 women.

As you may know, the prison itself is located in the village of Windsor, but the State owns a farm of 450 acres situated three miles from the prison.

We keep on the farm a large herd of cattle which has produced during the past year more than 140,000 pounds of milk,—all the milk which is used at the institution. The farm raised 210 tons of hay, 170 tons of ensilage, 1,500 bushels of potatoes, 300 bushels of beets for cattle, 220 bushels of carrots, 1,000 bushels of field corn, 188 bushels of onions, 48 bushels of wheat, 78 bushels of barley, 142 bushels of rye, 74 bushels of beans, 432 bushels of oats, 5 tons of squash, 288 gallons of maple syrup, 1,200 quarts of strawberries, 300 quarts of raspberries, \$717 worth of eggs at the market price and \$853 worth of hogs dressed, for the use of the institution.

The inmates are employed all the time in some industrial work within the walls of the institution or some work outside the walls,—for those inmates who can be trusted. It is absolutely necessary to furnish some employment to men and women who are confined. Once in two weeks there is a moving picture show in the assembly room at Windsor. The inmates have also a brass band and have gotten up several entertainments which are first given to

the inmates themselves and later, when they are creditable, have been presented to outsiders for whom an admission is charged. The receipts from these entertainments are used to buy musical instruments and other things for the comfort and enjoyment of the inmates; things which the State would not ordinarily furnish.

We have a night-school for minors and anyone else who desires to attend, though we can compel only minors to attend.

We have had as high as 20 pupils at one time, mostly foreigners who are eager to get instruction.

For the month of November, outside of shop work, the amount of earnings was \$1,231.00; of this the State received \$821.00 and the men themselves received \$410.00.

In the month of December they earned \$2,224.76; of this amount the State received \$1,500.00 and the inmates \$725.00.

The total amount received from March 1st last year to January 1st was \$12,975 of which the inmates received \$4,131.00. The money was paid to the men themselves personally, going to the credit of their account at the institution or was sent to their families.

HOME FOR FEEBLE MINDED AT BRANDON.

Contains 33 boys and 77 girls. About all that can be done for these unfortunate children is to give them such work as they are able to do and an occasional moving picture show and a song service, and other simple entertainments.

The boys are taught to do farm work and the girls simple house work and the care of laundry. Early in the year 1919 the State put in repair a school building purchased of the town of Brandon and a day school was established. This year there are 39 boys and girls selected out of the total number of 109 representing the higher grade of mentality in attendance. The success of this venture has succeeded beyond our expectations, as substantial elementary improvement has been obtained. The school is soon to begin the manufacture of braided rugs and other industrial pursuits will follow.

There is a herd of blooded cattle started at Brandon, to which boys will take kindly. A grade herd supplies the institution with milk.

Products: Hay 98 tons, ensilage 100 tons, oats 275 bushels, corn 140 bushels, potatoes 597 bushels, onions 93 bushels, maple syrup 52 gallons, milk 108,505 pounds. The

inmates have canned all the vegetables and fruit they will use for the year to come.

THE INDUSTRIAL SCHOOL AT VERGENNES.

Is one of the State Institutions which you would all be greatly interested in visiting. There are 158 boys and 81 girls. These children are required to attend school same number of weeks as public schools. This year by addition of two new school rooms pupils are given 1st year in high school; more advanced pupils attend school in the city of Vergennes; 12 children now in attendance in different classes, second to the fourth year; 1 boy is president of his class, brass band in school, 20 members and orchestra to be organized among the girls; all instruments used, gifts of friends of the institution.

In addition to above, instruction is given in agriculture, including raising of poultry, and creamery work; elementary plumbing and steam fitting and a small printing outfit is to be installed soon. Girls are taught to do housework including laundry, sewing, making their own clothing, cooking and they are soon to take up basketry.

Six clubs, representing as many cottages have been formed, only those are eligible who prove worthy in their deportment. Once in 2 weeks the six clubs meet in a common hall for discussion of current topics.

At the State Industrial School we have a fine herd of registered Ayrshires, 37 in number. These together with some grade cows have furnished all the milk and butter that has been used at the institution for the past year.

Children are all on their honor, one big family, segregated according to their age and propensities, and every home influence that can surround their lives is given them by the official family.

Produce: Hay 175 tons, ensilage 150 tons, potatoes 584 bushels, cattle beets 450 bushels, beans 160 bushels, corn 440 bushels, oats 1,800 bushels, wheat 428 bushels, barley 30 bushels, peas 20 bushels, 3 tons of butter, 1,128 dozen of eggs and 229,270 pounds of milk and all small garden truck used. The inmates have canned all fruit and vegetables they will use for the coming year.

THE STATE HOSPITAL AT WATERBURY.

Contains about 1,000 people.

The general industrial work is farming for the men and housework for the women. We have just started an

industry for women, the braiding of rugs, and also started a broom making plant for the men.

Occupation is the greatest thing to be desired for these unfortunate people. There are entertainments and moving picture shows, song services and that is about all that can be done for the comfort of most of them.

We have a large farm connected with this institution on which is a herd of 100 registered Holstein cattle, 62 of this number are milch cows. We have 200 hogs on the farm and during the past year, they furnished to the institution 29,300 pounds of pork, practically all of which has been consumed. The herd has furnished the institution during the past year with 495,000 pounds of milk.

Produce: Hay 300 tons, ensilage 400 tons, carrots 251 bushels, potatoes 1,300 bushels, cattle beets 364 bushels, onions 200 bushels, corn 480 bushels, squash 9 tons, eggs produced 895 dozens, pork produced for institution 15 tons, pounds of milk produced 495,848. Canned for use of institution 19 tons of corn, $3\frac{1}{4}$ tons of beans.

You can see that a very large part of the living expenses of these institutions is raised on the farms attached to them; nevertheless, the State has to provide a large amount of supplies; that is all done by a requisition from the head of each institution and by him transferred to the Purchasing Agent.

The Purchasing Agent practically buys all the material used by the State. He examines all bills and approves them before they are sent to the Auditor's office for payment.

There is no question but that this Department, as it is now administered, is a great saving to the State on account of buying in large quantities and taking advantage of market conditions. The State is often times enabled to buy for a much lower price than you or I can. I do not know what you are paying for sugar, but the State of Vermont is paying about 9 cents per pound, having bought a year's supply at that price.

We can also save money in flour by buying in large quantities and sometimes on cloth.

No money passes through the Purchasing Agent's office; he only contracts for supplies and O. K's the price and quantity furnished. The bills are all paid by the treasurer after having been examined and passed by the State Auditor. It is a very difficult thing, these days, to get any money out of the Treasury of Vermont, unless you have a bill which is approved by the Purchasing Agent and certified as to the

authority for the purchase, as well as the correctness of the bill by the Auditor.

ACCOUNTING SYSTEM.

One of the promises I made the people of Vermont was to give attention to the establishment of a modern system of accounting. Thanks to the most efficient and hearty cooperation on the part of the auditor, treasurer and their competent assistants, aided by the reports of experts, and their own observation in other states, we have a system of accounting *which I believe for simplicity and efficiency is not equalled in New England.* This has not called for any very radical changes but merely for the application of modern business methods to the State's affairs. I will merely give you an outline of the methods followed in the auditor's and treasurer's office: A claim or bill is carefully checked when received by the auditor and if found correct, a warrant therefor is made out in duplicate. These warrants are now made out on a sheet similar to that which I hold in my hand, (A) which is a permanent record, and is finally bound in a volume in the treasurer's office; a duplicate on another color of paper being retained in the auditor's office. This sheet shows the name and address of the payee, the purpose of the warrant, number, amount, and the appropriation to which it is charged, being duly certified by the auditor. As soon as it is received by the treasurer, voucher checks similar to the sample (B) are written on a special pin-point typewriter in the treasurer's office. Errors in mailing out checks are practically prevented by the use of "window" envelopes,—envelopes having a transparent front through which the payee's name on the treasurer's check shows.

For the purpose of record, the transaction is then complete. The auditor has the voucher of the payee for his receipt; the treasurer has the auditor's warrant, and when the checks are indorsed and paid, a third check on the transaction is provided.

The auditor also keeps a card index of all claims, so that he may see at a glance whether a claim has been paid, thus preventing duplication of payments, and also providing, by means of this index, his book of warrants and other index records practically a three-way check; so that he can turn almost in a moment to any given claim or any given transaction.

This is a great convenience, not only to the State officers but to the public, and by means of the appropriation

ledger, which is kept in duplicate in both the auditor's and treasurer's office, it can also be seen at a glance where each appropriation stands as to money expended and balance; in fact, the State opens an account with each appropriation the same as your creamery might open an account with you; so that when the auditor presents a statement on the blanks, which I show you, (C) the Board of Control or any other State officer can see immediately what the condition of each appropriation is; whether heads of departments are living within their means, or whether it may be necessary to shut down here or there, or possibly increase activities.

There is no more business passing through the State's books without audit. There has been some criticism of the manner in which State highway money has been expended, but even these certificates are carefully audited before being paid.

Furthermore, the auditor no longer pays out money or its equivalent. All State funds are paid direct to the State treasurer. Department heads don't run bank accounts of their own and they make no disbursements on account of their own departments; there are no advances made, except certain petty cash for purposes of convenience in paying for stamps, express, etc., which is under the absolute check of the Board of Control.

BOOKKEEPING.

You would not, perhaps, be interested in the details of the bookkeeping; but you ought to know that the daily balance ledger in the treasurer's office shows exactly where the State stands financially every night or every minute, if necessary. You will see that under this system the payee never sees or handles the auditor's warrant, so there are no more State orders peddled around banks, stores and post offices. It is a fact that some old orders are still stringing in, which were issued before July 1, 1919.

You may ask where the check on all these transactions come. The system is practically inter-checking; but as a matter of routine, the revenue clerk in the auditor's office checks the treasurer's books each month, and an outside auditor, under the direction of the governor, checks both offices once a year. The Board of Control also receives regular reports from the treasurer and auditor each month, or oftener, if necessary, and in a very active manner supervises the business of the State.

The system, in fact, is very much like that of a large corporation,—the governor representing the president or

active manager; the Board of Control, the Board of Directors, and the heads of each State department in charge of their own work, largely as it is in any business.

You may be interested in knowing that the total receipts in the treasurer's office for the 6 months ending December 31, were:—\$4,590,091.65. This included money paid in on account of bond sales of \$1,322,000.00 (the latter, as you remember, chargeable largely to war expenses,—the State already having disbursed in pay to soldiers and sailors:—\$1,108,793.30). Some idea of the amount of business handled by the State is given by the fact that a 6 months-turn-over in the treasurer's office was \$3,284,584.53. These transactions, of course, were not all State expenses but ran into transfer of accounts, payment of notes, etc., but all had to be handled under the careful inter-checking system, which I have described.

REVENUE PROBLEMS.

You will understand from the foregoing that the State of Vermont is in business on a very large scale, and that it takes a lot of money to pay our bills.

Last March, the legislature first estimated the necessary State tax at 20 cents on the grand list per year. After the appropriations had all been checked up, it was found necessary to levy a State tax of 40 cents. Those of you who come from small towns will bear me out in the statement that we have reached the limit of taxation, and unless we are able to check the continual extension of State activities and the necessary increase of State expenses that go therewith, a large number of Vermont towns will be faced with bankruptcy.

Owing to the piling up of appropriations, after March meeting, in the legislature last year, a great many towns, in fact, I believe a majority of towns, failed to appropriate the necessary 40 cents, the result being that they had to borrow money in order to pay their bills.

When we consider the small amount of taxable property and the absolute necessity of increasing the pay of teachers, for instance, the increasing cost of doing highway work, etc., it will be seen that the problem of meeting the cost of doing business and paying the State tax in many Vermont towns, is going to be very serious during the coming year. Some of them will have to appropriate not only the 40 cents necessary to pay the State tax, but enough more to make up what they borrowed last year.

Take the town of Belvidere, for instance, with a grand list of about \$2,500 and 105 taxable polls. The tax rate of \$3.00 will be insufficient. This also applies to Wardsboro, with a grand list of less than \$2,300 and 112 polls and a present tax rate of \$4.60; and Concord, with a grand list of less than \$6,600 and 298 polls, will probably find its enormous tax of \$4.35 insufficient to do business on. There are scores of examples which I might cite from the records of the tax commissioner, but in a general way I cannot impress upon you too strongly the necessity, first:—of honest grand lists,—setting the value of property at its lawful figure; second:—the need of absolute economy in the conduct of not only the town affairs but all State affairs.

You should impress upon your representatives in the legislature of 1921, the fact that probably three-fifths of the towns in the State will be in financial difficulties before the end of the year, and that the State revenue from known sources will probably be less rather than greater. The slogan "Something to Tax" has certainly served its purpose, and we must immediately face the proposition of finding "Something to do without," if our towns are to continue as solvent units of a great corporation.

THE MARKET MILK BUSINESS.

W. P. B. LOCKWOOD, PROFESSOR OF DAIRYING, MASSACHUSETTS AGRICULTURAL COLLEGE, AMHERST, MASS.

Ladies and Gentlemen:—

Last Friday morning I received the program for your meeting and learned for the first time that I was scheduled to speak on the Market Milk Business. The business is so large and has so many different phases and relations that it would be impossible for one to prepare an exhaustive paper in so short a time. Nor would it be possible to discuss it fully in one short hour. There are however some things that might be discussed.

I fully believe that few of us that are connected with the production, transportation and distribution of market milk really appreciate the importance and size of the business. Let us first understand what we mean by market milk.—It is liquid milk and cream consumed as such, by drinking or cooking, in the country, towns and cities. In the popular sense of the word, consumed in the towns and cities.

The following estimate taken from a tentative statement of the Bureau of Markets for the year 1918 is quite enlightening:—

The estimated population of the United States was 105,000,000. The city population estimated at 45% consuming .7 lbs. per day, the population of farms with cows 30% consuming 1.5 lbs. per day, the population of other farms and small towns 25% consuming 1 lb. per day.

Total consumption 38,899,875,000 lbs. or 44.25% of the total milk produced by all cows in the United States for the year 1918.

Let us compare this with the milk used in the manufacture of some of the dairy products:—

The amount of milk made into creamery butter represents,	19.10%
The amount of milk made into farm dairy butter represents,	16.91%
The amount of milk made into cheese represents,	4.45%
The amount of milk made into condensed milk represents,	4.45%
Total,	44.91%

Then a total of the amounts of milk used to make the four largest produced dairy products exceeds the total amount consumed as market milk by seven-tenths of one per cent.

According to the above figures it takes over 9,880,000 cows to furnish the market milk alone.

The business started when people began to give up nomadic roaming and to have fixed abodes. There are some records about it in Egypt, 2,000 B. C. and in India in 1,500 B. C.

The market milk business in the United States started when one or more people having a cow furnished neighbors with milk. This usually occurred (and still occurs) in a small scattered settlement or small town. When towns developed or grew larger one or more men made it a specific business to produce and deliver milk to the town people. These towns grew larger into small cities so that a larger number of men took up the business. The cities grew larger and the immediate surrounding country was not able to supply the milk needed, so some of the men stopped producing and delivered only. They began to go further away from the cities for their supplies until today we have the large delivery companies in the cities taking the milk from large numbers of farmers or producers who are too far away from the market to deliver it individually. This has been a gradual growth, the largest development having been made in the last 25 years, accompanying rapid growth in population in the cities.

According to Parker "Prior to 1840 little milk was shipped by rail. All was brought in in wagons. Boston had a population of 100,000 and New York 300,000."

The man with one cow has a small investment. The delivery is taken care of by the neighbor bringing his pail. He has small responsibility.

Dr. A. W. Gilbert, Massachusetts Commissioner of Agriculture, recently stated that the Boston Delivery Companies had probably \$5,000,000 invested in their end of the business and that the milk producers for the Boston market had an investment of close to \$50,000,000, making a total investment of 55 million dollars for this one market.

With the growth of the business have developed many complex problems. The producers' problems have been along the line of economic and sanitary production, and the securing of a reasonable remuneration for their work. The railroads in providing proper transporting of milk long distances and delivering it to the cities in proper condition for consumption. The processing and delivering agency

has problems of supply and demand, quality of product purchased, price, delivery and union labor troubles. Both the producer and distributor have certain relations with the health authorities.

Governor Lowden, of Illinois, called the dairy cow "the foster mother of the world." He was right. When a mother cannot nurse a child she turns to cow's milk as a substitute. When people are sick the doctor usually says use more milk. Doctor McCollum's work in animal nutrition shows that milk fat is necessary for the growing child and is also necessary to prevent some types of disease. This work of Dr. McCollum and others who have worked along these same lines has been one of the greatest discoveries, relative to the dairy business.

Let us consider another phase briefly. Milk is a universal food demanded by the people in towns and cities as well as those in the country. It is used largely by children, women and the sick, but to some extent by men. It is a very perishable food, in fact the most perishable. It is produced as far as 350 miles from where it is consumed. It is a food that is easily adulterated by unscrupulous persons and one that is easily contaminated both by the unscrupulous and careless, and sometimes accidentally by those who use the utmost care. It has long been known to the medical profession that dirty milk has been a cause of sickness with children who depended wholly on it for food. I have had a case of this in my own family and fully agree with them. Milk has been known to be a carrier of communicable diseases.

The individual who purchases milk for his family has neither the time or the money to look out for his milk supply. Milk is a recognized factor in the public health so the health officer looks after it, or is supposed to look after it, for the individual or group of individuals as represented by the citizens of the towns and cities. Some times this has been done judiciously and with care, oftentimes it has not.

There is probably no single private business that is tied so closely with public health or that is so closely watched and regulated as the market milk business. On the other hand there is probably no other business that has been attacked so viciously by the press and public, investigated by all kinds of committees who are in no way familiar with the complexity of the business. The wrong side has been held before the public and no credit given to the much larger part that milk and milk products is taking among our food products. Authorities say that milk and milk products now form 20% of our American diet, but they could well be 44%

of the diet substituting largely for meat and fish, reducing costs and making us more healthy and happy.

The question of supply and demand and surplus is in itself a big problem.

The season in which milk is produced in the largest quantity is not the season in which there is the greatest demand or market for it. Producers have only been able to over-come this partially by breeding so as to have, at least, part of their cows coming in at the desired time. On the other hand the distributor must carry enough milk to meet all demands at all times. In order to have this supply in the shortage season more milk is made than can be used in the flush season. At all times there is a certain amount returned from the wagons, caused by changes in orders, etc., over which he has no control. In the large cities probably the largest amount of milk is sold wholesale to restaurants, hotels, bakeries, etc., etc., Sundays and holidays these places do either no business or a very reduced business, yet the supply of milk in the country is continuous. The country plant aids to some extent saving, at least, transportation and higher manufacture costs in the city.

Undoubtedly the country plants (those that can ship milk, or make cream and butter, etc.,) are an advantage. Where the farmers own these plants they, at least, know they are getting out of their milk all that can be gotten out. The biggest factor that I can see is they must have good managers. It is hard to find men of sufficient ability to compete with the large well organized companies. Lack of enough capital to hold goods in storage has been a disadvantage in some instances.

There is probably no food other than milk that the nature of it makes it necessary for daily delivery. This taken with the fact that it has to be purchased in small quantities and delivered in a container that costs approximately one-half as much as the food contained, and that this container is loaned to the purchaser. The use and abuse of bottles; breakage, loss, use for other purposes, makes this one item an expensive one.

Another big problem, and one which is visible to every one, is the duplication of ground covered in delivery of milk. Long routes to dispose of comparatively small amounts of milk, and three, four and even more wagons delivering milk in the same block. Various suggestions have been made to overcome this but none were practical. Some places have considered municipal plants,—I believe this is the last thing that we want as the milk business would be worse off than ever if scrambled with politics.

There is a tendency in the smaller cities for groups of delivery people to get together, pool their milk, have a plant for pasteurizing, then each take certain sections of the city for delivery. This tends toward a safer supply and a cutting in delivery costs. These are usually in the form of co-operative associations.

The tendency is toward all pasteurized milk. 90% of the New York supply and over 80% of the Boston supply is pasteurized. In so far as I know no milk borne epidemic has been traced to pasteurized milk. The same cannot be said of raw milk. Aside from this, properly pasteurized milk is a safeguard against tuberculosis being carried by the milk that is used for child feeding.

A milk distributor in the east to whose milk an epidemic was traced told me that he had believed in raw milk, and had done everything in the way of control and inspection possible, and he found it did not take the place of pasteurization in safety. There were too many places where things might happen over which he had no control. This man was in my opinion trying to do what was right. It hurt him to know that people had suffered through his milk supply. It hurt his business and eventually reflected in the loss of business to his producers.

The labor situation in the cities has caused much trouble. In some places the drivers are organized, belonging to the union. One delivery company's man told me that their minimum wage was \$35.00 per week. In addition there were bonuses, etc., that brought some drivers' salaries to \$55.00 per week. In New York City all employees belong to unions. They are compelled to pay "clean up" men \$29.00 per week.

Advertising has been done in the past, the results being that what one gained another lost. This year a "use more milk" campaign has been put on in Boston and some other Massachusetts cities. The general director of this campaign has been the Dairy Extension Specialist from the Massachusetts Agricultural College. Those back of this campaign are the Massachusetts Agricultural College, the State Board of Agriculture, U. S. Department of Agriculture, Women's Clubs, Catholic Women's organizations, Board of Health, and other organizations cooperating. The funds have been furnished by the dealers, producers, public citizens and some of the organizations. The schools are visited and children shown what milk will do for them. All means that will impress both the parents and the children are used to stimulate the use of more milk. The result has been the increased use of milk to the extent of approxi-

mately 15%. All interests were benefited—the consumer, the distributor, and the producer.

This is one business that can through its intimate connection with health and growth enlist the support of all organizations to promote its growth. I know of no other business that can be so universally supported for the benefit of every one concerned and the state and nation as well.

THURSDAY FORENOON SESSION.

DAIRY BUTTER 1920.

Name.						
Sep.						
Salt.						
Col.						
Fla.						
Gr.						
Col.						
Salt.						
Gen.						
Ap.						
Score.						
George Gebbie, Groton,						95
L. B. Page, Randolph,						93
R. S. Hall, Shelburne,			W			96
H. M. Lee, Windsor,			W	S		97½
Chas. Gates & Sons, No. Hartland,	W		W	A		94
M. G. Eastman, Lyndonville,						93
L. W. English, Woodstock,			W	D		95
Frank Teer, West Rutland,	DL		P			91
E. J. Talbert, Barre,						94
J. B. Candon, Pittsford,	DL		W			95
Angle M. Harrington, N. Pomfret,	DL		W			96½
C. H. Leonard, N. Pomfret,	DL		W			95
Mountain View Farm, East Burke,						95
D. A. Blaine, Barnet,						96½
E. F. Kibby, Randolph Center,						95
Creamery Butter.						
W. C. Porter, Sharon,			W	CH.		96½
H. L. Lyster, Wells River,	D		W	CH.		97
A. E. Sparks, So. Londonderry,			DC	O.D.		95½
S. L. Harris, Proctor,			W			97
Plyna Douse, McIndoes,			W	CH.		92
John Bond, East Montpelier,	DL		W	WR.		97
W. A. Vancour, East Hardwick,						96½
E. C. Hillis, North Montpelier,			W	WR.		97
W. P. Stone, South Strafford,	W			CH.		95
Green Mountain Creamery,						
North Craftsbury,			DC	D		98
J. J. Kalahan, Starksboro,						95
F. L. Giddings, Orwell,			W	D		91
Sherburne Creamery, N. Pomfret,			W			97
L. A. King, East Corinth,	DL		W	D		97
Harry Lanow, South Hero,						97
C. M. Lilley, Marshfield,			W	WR.		96½
F. A. Rist, Wilmington,			DC	H		95
Ray Montgomery, Worcester,			W	D		96
Mt. Mansfield Creamery Ass'n, Stowe,						94
Donald B. Corey, West Hartford,			DC	D		95
Whole number of entries,	35					4
Highest score,	98					
Lowest score,	91					
Average score,	95 1-3					

Association Gold Medal and Creamery sweepstakes cup, Green Mountain Creamery, North Craftsbury, score 98.

Dairy sweepstakes cup, H. M. Lee, Windsor, score 97½.

ERADICATION OF TUBERCULOSIS FROM VERMONT HERDS.

**ADDRESS OF E. S. BRIGHAM, COMMISSIONER OF AGRICULTURE,
DAIRYMEN'S CONVENTION, JANUARY 14, 1920,
BURLINGTON.**

According to the assignment of your secretary, I am to talk to you for a second time about one of the most disagreeable subjects connected with the dairy industry, namely, bovine tuberculosis. Two years ago I discussed this subject with special reference to the accredited herds plan which it was proposed to adopt in this state in co-operation with the U. S. Bureau of Animal Industry. That plan has now been adopted by forty-four states and is meeting with general favor, both here and in the other states where it has been tried.

Today I would like to talk to you about the new tuberculosis law enacted by the last legislature, about what is being done under it in co-operation with the Federal Government, about what expense will be involved if we eradicate tuberculosis from our herds within a reasonably short time and what would be the results of such a policy.

OUR NEW TUBERCULOSIS LAW.

The revision of our live stock laws enacted by the legislature of 1919, made very important changes in the state's policy with reference to tuberculosis control. I have made some investigations through a careful study of our live stock laws since the first enactment of 1894 and through consultation with the men who were most active in securing these laws, for the purpose of finding out just what has been the intent of our legislatures in singling out tuberculosis from a multitude of bovine diseases, and appropriating large sums of money to deal with it. The reason seems to have been that tuberculosis of cattle has been all along considered to be a disease injurious to the public health and destructive of a great industry from which a great number of our people gain their livelihood. Therefore, it is a wise expenditure of public funds to take such measures as will eradicate it from our herds. I found no one who had given the matter any thought, who did not believe that eradication of the

disease should be the end and aim of any policy of tuberculosis control which could justify public support. I found also that my predecessors in office agreed with me that we were falling far short of the eradication mark because the commissioner of live stock was not given authority, under the law, to require as a condition of making a tuberculin test at the expense of the state and the payment of indemnity for reactors revealed thereby, the observance on the part of the herd owner of those precautions in the future management of his herd which ordinary common sense would suggest as necessary to guard against reinfection with the germs of a contagious disease. Furthermore, a large lump of the appropriation was used in payment of indemnity for reactors found as the result of private tests made by approved veterinarians of a few animals in a herd which had been singled out for sale and must be tested before they could be shipped interstate. This was called protection to shippers, was insurance pure and simple, and by no stretch of the imagination could it be construed as contributing one iota to a policy of eradication.

The revision made by the legislature of 1919, in my opinion, went a long way toward remedying these defects. The changes made are essentially these:—A herd owner may now, as formerly, ask the state for a tuberculin test of his stock, but before giving such test the commissioner of live stock is required to have the owner sign an agreement which prescribes as a condition of such test the observance on the owner's part of such measures as shall be deemed necessary by the commissioner to keep the herd free from tuberculosis. Teeth were put into the law in the way of requiring the herd owner to live up to his agreement or forfeit his rights to further tests and indemnity. Not one cent of indemnity is now paid by the state for animals reacting to the tuberculin test applied privately for purposes of shipment or otherwise unless the owner submits his entire herd under the agreement above mentioned for the tuberculin test. And, finally, the commissioner of live stock is given greater supervision over imported cattle in the way of authority to require a sixty-day retest of animals imported into the state.

WHAT IS BEING DONE UNDER THE LAW.

The terms of the agreement which the commissioner under the law requires the owner to sign, as a condition of making a state test, are principally four:—

1. Tuberculin tests made as often as is thought necessary, which is, in most cases, once a year;

2. Untested cattle must not be allowed to mingle with the tested herd;

3. Milk or other dairy products fed to calves from outside or unknown sources must be pasteurized;

4. Reasonable sanitary measures suggested must be carried out.

This is in brief the procedure outlined by the officials of the U. S. Bureau of Animal Industry and the Association of Live Stock Sanitary Officials of the United States as necessary for an owner to follow if he would produce and maintain an officially tuberculosis-free accredited herd. The requirements are simple and are absolutely necessary, as common sense would suggest, if a herd is to be freed from tuberculosis and kept free. They are the minimum requirements which may be levied upon a herd owner if the state's money is to be used for purposes of eradication.

All testing of herds under this agreement is being done in co-operation with the U. S. Bureau of Animal Industry upon the following terms:—

1. The Bureau pays one-half the salary and expenses of the inspector in charge of the work, and provides part of the clerical force. It provides two lay inspectors to supervise disinfection of premises and furnishes five of the ten veterinarians we now have in the field;

2. The Bureau pays toward indemnity for reactors one-third the difference between the salvage and the appraised value, with a limit of \$25.00 for each grade animal, and \$50.00 for each pure bred animal, and a further limitation that it will pay for no animal a greater sum than the state pays.

Now, what is the net result of all this to the state of Vermont and the Vermont dairyman? The Federal and State governments essentially say to the Vermont dairyman, "We want to enter into partnership with you to make that portion of our territory which is represented by your farm free from tuberculosis: here is a policy which you may follow in the management of your herd which we believe will soon lead to freeing it from this disease. If you want to enter into this partnership we will test your herd, at least annually, free of charge until it has passed two annual tests without reactors, when it will be accredited, advertised as a clean herd and cattle from it may be shipped interstate for a period of a year without further tests. Furthermore, we will pay you for cattle which we condemn, 75% of their appraisal value up to a limit in appraisal value of \$100 for a grade and \$150 for a pure bred animal."

The Federal and State governments, furthermore, not in fact but in essence, say to the man who does not believe there is such a disease as tuberculosis and who does not believe in the tuberculin test, "You are at liberty to indulge yourself in this belief, but when you do business with people who do not agree with you, and you find it necessary to make tuberculin tests of your cattle in order to qualify for sale, you must be consistent and stand your own losses." I think this is perfectly fair and just in every respect. If this policy is continued it will mean that every dollar of the state's money we spend will count toward eradication of the disease from the herd of the dairyman to whom it is paid and the freeing of the entire territory of the state will mean simply securing the co-operation of herd owner after herd owner until every farm is free.

There seems to be a growing sentiment in the state that every herd owner should be compelled to submit his herd to the tuberculin test, apart from the expense involved, which will be considered later. I have never believed in the policy of compulsion, because the production and maintenance of a tuberculosis-free herd is not the result of the application of one or two tuberculin tests, and the elimination of reactors found, but rather is the result of eternal vigilance on the part of the owner in the way of repeated tests and in the way of guarding against the re-introduction of infection from outside sources. The careful and continued co-operation of the owner may, in my opinion, be secured better by securing his voluntary co-operation than by compelling him to do something against his will. In fact, our present law provides compulsion by economic pressure, by adding value to the cattle of the man who tests through the distinction given him, and by leaving the man who does not test to stand his own losses. There is today in many parts of the state a difference of at least \$25.00 per head between tested and untested cattle. This is the very best kind of compulsion, because it rewards the profitable servant for his good accounting.

RESULTS OF THE NEW LAW.

The result of the enactment of this new law and the consequent change of policy has been to arouse an interest in and a demand for tuberculin tests of herds far in advance of the ability of the Department of Agriculture to handle the work. On July 1st last we estimated that we would have available for indemnity from Federal and State funds and from salvage received for reactors approximately

\$200,000 which sum would with a normal percentage of reactors enable us to test 25,000 cattle. At times I had my doubts if such a large number would be offered.

On November 29th, however, we had tested 631 herds and 12,610 head of cattle and had on our waiting list 637 herds and 9,552 cattle, or a total of 11,268 herds and 22,162 head of cattle.

On January 3, we had tested 914 herds and 16,437 cattle and had on our waiting list 847 herds and 12,318 cattle or a total of 28,755. If we take care of this business we shall exhaust this year's appropriation and eat well into next year's. This would seem to be proof positive that the farmers of Vermont are ready to enter into voluntary partnership with the Federal and State Governments to do what is considered necessary to free their herds of this disease.

Assuming that our farmers are ready to submit their herds to the tuberculin test more rapidly than our present appropriation will enable us to do the work, the question is, what is the best policy for the state to pursue, to continue the present appropriation of \$100,000 and do what work can be done with this together with funds received from the Federal Government, or to increase the appropriation to match to the limit Federal funds available, with a view to quickly eradicating the disease from the state?

An answer to the question involves an inquiry into the probable expense and the results to be obtained from both policies. The listers' census taken in April, 1919, shows that we have in the state 369,484 head of neat stock. Our present appropriation of \$100,000 remains in force until June 30, 1921. At that time I estimate that we shall have 69,000 head of cattle tested under the co-operative agreement plan and practically free from tuberculosis. This will leave 300,000 head yet to be tested. The appropriation of \$100,000 will probably enable us to make retests of herds until accredited, and take on 20,000 head of new cattle annually. At this rate it will require fifteen years to clean up the herds of the state and at the present rate we are receiving applications it will mean that many dairymen will have to wait two years after making application before a test can be given them. It is a significant fact that at the time of the meeting of the live Stock Sanitary Officials at Chicago on December 1st, there were 3,000 applicants in the United States waiting for a co-operative State and Federal test, and of this 3,000, 900 were in Vermont.

If the next Legislature should appropriate money enough to keep up with our present rate of applications, probably \$250,000 annually will be required. This sum will

probably enable the live stock department to keep up with the retest work and take on 50,000 head of new cattle each year. At this rate all the herds of the state could be tested in six years, at the expiration of which time the expense of indemnity would begin to decrease. The question then is, shall the state incur a heavy expense for a few years and clean up its herds, or shall it appropriate a smaller sum annually and be a greater number of years about it?

While I think all are agreed that eradication is the desired end, there may not be agreement upon how quickly it should be done.

Personally I am a firm believer that it will be economy for the state to appropriate sufficient funds to keep pace with the demands for the work up to the limit, at least of Federal funds available for this purpose. My reasons are these:—

1. Tuberculosis is a progressive disease. At certain stages it will spread rapidly in a herd until all animals are affected. Furthermore, a tuberculous herd is a menace to all other herds with which it may in any way come in contact. Therefore, the sooner we test our herds and remove tubercular animals from them, the sooner shall we stop the spread of this disease, and the less expensive it will be, because we shall have fewer animals for which to pay indemnity.

2. Bovine tuberculosis is a menace to the public health of such proportions that its eradication becomes of interest to all classes of people. A clean, healthful milk supply for our children is a consideration which cannot be reckoned in terms of price.

Boston and New York are our most important milk markets. Arrangements have been made with the milk inspector of Boston to give full credit for points allowed on the Boston score cards to herds which are tested under agreement. The Department of Health of the City of New York has for over a year required a certificate of physical examination, made by a veterinarian, of herds contributing to the milk supply of that city. Arrangements have been made with the Director of the New York City Bureau of Food and Drugs to have this examination made by our veterinarians when making tuberculin tests of herds the product of which is being shipped to New York.

The following is an abstract from the director's letter:

"The value of the work which your department is undertaking in co-operation with the United States Bureau of Animal Industry is rec-

ognized, and if the practice of maintaining herds of cattle free from tuberculosis becomes general, the resultant benefit to all communities consuming milk produced within the State of Vermont is obvious. This department is ready at all times to co-operate with your bureau in every possible manner consistent with the Sanitary Code of the Board of Health of the Department of Health of this city, and the rules and regulations pertaining thereto."

3. The dairy industry is Vermont's greatest industry from the standpoint of persons employed, capital invested and gross earnings of the business. Our dairymen receive revenue from sales of market milk to the cities to the south of us, from butter, cheese and condensed milk, and also for the sale of dairy cows to replenish milking herds on farms near large cities where land is too expensive to warrant the growing of dairy heifers. No other industry in the state has such great possibilities for expansion as our dairy industry, because we have the natural conditions of soil and climate to make this possible. This expansion will be conditioned upon many factors:—upon our use of pure bred sires and the proper development of our cattle, but the foundation of it all, I firmly believe is the tuberculosis-free herd, because all other improvements will avail us nothing if there is at the same time undermining all we do this insidious disease which casts reflection upon the healthfulness of our dairy products and our cattle. We can never make a reputation on damaged goods and I believe it is time that all of us who are interested in this industry (and every citizen of Vermont is interested in it) to make a concerted effort to cast off this parasite which saps its life.

An appropriation of a quarter of a million dollars a year may seem large for a little state like our own. But I hold that it is good business for a state to develop the tax-paying ability of its people. If the pursuit of a policy, which means the rapid eradication of tuberculosis from the herds of Vermont, will by the reputation for improved quality which it brings our dairy products and our live stock, add value to these commodities, so that the tax-paying ability of our people is raised, then the expenditure is simply an investment upon which we may realize rich returns in the future.

I need not argue with the members of this association that this is so because you know from your own knowledge and experience that it is. Let us then build our dairy industry upon the foundation rock of clean herds, and success is sure to follow.

RECEIPTS AND EXPENDITURES OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1919.

M. A. ADAMS, TREASURER.

Receipts.

1919.	
Cash on hand,	\$ 445.43
State appropriation,	1,000.00
For membership fees,	93.00
Received for space sold and for advertising,	555.14
Received from Grimm Est.,	18.00
Total receipts,	<u>\$2,111.57</u>

Expended as Follows.

Jan.	1	O. L. Martin, bill, postage and stamps,	\$ 50.00
		St. Albans Messenger Co., printing reports,	119.00
		Orrin Bent, scoring butter,	50.00
		Mary I. Wood, speaker,	60.62
		W. C. Reynolds Co., rent of chairs,	20.00
		G. S. Smith,	61.78
		F. H. Bickford,	6.64
		Luella F. Bickford,	6.64
		O. L. Martin,	20.61
		Pauline Conning,	17.00
		Jas. B. Estee,	5.52
		Hotel Vermont,	155.35
		W. F. Schauch,	18.17
		W. H. Harrington,	29.37
		Bogle Bros.,	29.56
		W. B. Bullock,	3.65
		A. W. Kimball, P. M.,	3.00
		Maj. Jas. A. Haggerty,	17.66
		A. C. Bigelow, speaker,	40.82
Mar.	8	Capital City Press,	229.50
		Transferred to premium list, balance,	127.80
		M. A. Adams,	• 19.70
Nov.	11	A. E. Munsell, stamps,	5.00
	24	O. L. Martin, salary,	175.00
		Bogle Bros., cups,	28.50

31	Bogle Bros., cups,	31.77
	Landmark printing,	2.75
	Cash in bank to balance,	785.37
	Total expense,	\$2,111.57

PREMIUM FUND.

1919		
Jan. 21	Cash for 186 lbs. butter at 70 cts.,	\$ 130.20
	Transferred from premium fund to balance,	127.80
		\$ 258.00

EXPENDED.

1919		
	Paid for 129 points butter at \$2.00,	\$ 258.00

REPORT OF COMMITTEE ON RESOLUTIONS.

Assembled in joint session, we the Dairymen and Sugarmakers of Vermont, express our appreciation of the efforts of speakers, exhibitors, the University, and of all who have contributed to the success of our gathering. Especially do we recognize the courtesy of the Burlington Light and Power Company in furnishing free light and power for use in the exhibitors' hall.

We believe that the Extension Service of the University of Vermont has done effective work during the past six years. We congratulate the last General Assembly and the State on the passage of the measure which has enabled county agents, home demonstration agents and boys' and girls' club leaders in 13 Vermont counties more adequately to serve their constituencies. We urge the Senate and House Committees on Agriculture in Congress to consider how important a thing it is in the interests of all classes of society that production be maintained at a profitable level, and how vital a factor in the solution of that problem is the educational work centering about the 48 Extension Services. We respectfully submit that the curtailment of extension funds would not be in the interest of true economy, but that, on the contrary, more would be lost than would be gained by the attempt to save a few dollars.

We deprecate the establishment by the Federal Department of Agriculture of the 82.5 fat standard in butter. We are at one with associations of buttermakers and creamery men in the Middle West and elsewhere in our belief that it is an inconsistent and impracticable figure. We urge the 80 standard commonly adopted in other countries.

We hereby instruct our Secretary to forward to the Honorable Secretary of Agriculture and to Honorable G. N. Haugen, Chairman of the House Committee on Agriculture in Congress, copies of these statements of our position touching extension work and the butter fat standard.

We are milkmakers and sugarmakers. We want to increase the use of our products. We believe in crying our wares. We commend the farsighted wisdom of those who planned the campaigns in our large cities and elsewhere, designed to set forth the food values of their products. We rejoice in their success. We believe that the money thus

spent is well invested and that bread thus cast upon the waters is sure to return again.

We are interested in the evidences of the spread of the cooperative spirit. Vermont farmers increasingly are buying and selling in cooperation. There are those who would deny them this right. There are those who refuse to quote them their goods. There are entire industries which are said to have refused to quote, except at retail prices, to cooperative organizations. Time was when the embattled farmers stood at Concord and what they then did the whole world knows. Time may come, in 150 years or less from that April day in 1775, when they again may stand. We believe that manufacturers who take this antagonistic attitude are ill advised. Yet, while we believe in dealing in combination and in large units, we hold steadfastly to the principle of trading with our neighbors and townsmen whenever it is possible to do so without too great a monetary sacrifice.

We heartily approve and earnestly commend to the thoughtful consideration of our members the entire address of our retiring president and more especially his admonitions as to the wisdom of adequate bookkeeping on the farm and his remarks concerning the labor situation. We regret the misunderstanding of his position touching the farm usage of oleomargarine, evidenced by the reports in the morning's paper. His long and honorable record as an officer in this Association and his lifetime close affiliation with Vermont's dairy interests are sufficient assurance of his orthodoxy in respect to oleomargarine.

We note with pleasure the stress our speakers lay upon the use of pure bred sires. God speed the day when the muffled drums' sad roll shall sound for the last scrub bull in Vermont. He is a bovine Bolshevik and should be deported.

We believe with our friend from Cornell University who spoke yesterday afternoon that it is better and cheaper to buy money of the men whose business it is to sell money than of the men whose business it is to sell feed or other farm supplies; and that it is better for the latter as well. We urge our members to think this over and to act accordingly.

We commend the stand taken by the National Grange, our State Grange and by many other representative farmers' associations touching the present attitude of organized labor. We see little in common today as between the farmer and union labor.

We are glad to note that farmers, more frequently than

in the past, are banding themselves together, that they are becoming less aloof, that they are bulking larger in the Nation's affairs. We welcome the formation of the National Federation of Farm Bureaus, believe in its purposes and are confident of its ability to accomplish them. We note with interest the announced intention of the President of the United States shortly to call to Washington a widely representative conference of farmers, analogous in its field to that heretofore called in the interests of industry. We trust that from such conference, much good may flow.

We recall the constructive work of the Roosevelt Country Life Commission of 15 years ago. We believe that it is high time that a similar survey was again made on a nation-wide basis. We feel that the results of such a survey, clearly setting forth to the consuming public the agricultural situation of to-day, would go far towards allaying the unjustly antagonistic feeling often manifested against the farmer on the ground that he is a profiteer.

Since last we met two of our former associates have passed to their reward.

Myron A. Adams, of Newport, formerly president of the Dairymen's Association, long time its treasurer, Senator from Orleans County, farmer, creamery manager, a quiet, unobtrusive, kindly gentleman, died at his home last summer. For more than a score of years he has been a constant attendant at our meetings. He did notable service 20 or more years ago in harmonizing an unhappy division in our ranks which for some time threatened to split the Association as under. This episode has been forgotten by many of us; indeed, the younger generation hardly knows about it. It was a very real service that he rendered and the weld he then made has stood the test of time.

Mrs. Carrie J. Nelson Shackford, of Ryegate, was long a regular attendant at our meetings. Year after year her butter won sweepstakes or stood almost at the very top. It is quite certain that no other person has borne home as many prizes from the Vermont Dairymen's Association as did Mrs. Shackford. Left a widow with a considerable family of small children, she paid off a mortgage, reared and educated her boys and girls, made her hillside farm pay, bred a fine herd of Jerseys. Surely we can believe that ere this of such a woman there has been said the Biblical "Well done."

Respectfully submitted,

JOSEPH L. HILLS,
JOHN B. CANDON,
E. A. BADGER.

THE FUTURE OF THE MARKET MILK FARM.

BY J. L. HILLS, DEAN COLLEGE OF AGRICULTURE, UNIVERSITY OF VERMONT.

Can the fertility of the market milk farm be maintained notwithstanding the constant loss of nitrogen, phosphoric acid, potash, lime, sulphur and other ingredients? Can its owner eat his cake and have it too?

The average Vermont cow produces yearly about 4,500 pounds of milk, containing somewhat less than 25 pounds of nitrogen and 10 pounds each of phosphoric acid, potash and lime, and a pound or more of sulphur. There are somewhat less than 300,000 cows in Vermont. I do not know how many of these are market milk makers, but my guess is that nearly, but probably not quite, 40 per cent of the milk made in Vermont passes outside of the State or away from the farm as such and that the money value of its plant food content is surely in excess of one and one-half million dollars and perhaps is as much as two million dollars. If an insufficient plant food inflow replaces this plant food outflow, the ultimate result will be disaster.

My guess—it is only a guess—is that perhaps 10 per cent of this loss is replaced in the form of commercial fertilizers used on market milk farms; that perhaps 50 per cent is replaced through commercial feed purchases—more than this is doubtless bought, but tolls are taken all along the line, by the cow, by leaching, fermentation, inadequate handling, etc.;—and that 40 per cent must be secured elsewhere if the soil fertility balance is to be maintained.

10 plus 50 equals 60. 100 minus 60 equals 40. Whence is to come the 40 per cent.? What will happen if it does not come?

The plant food which flows down our railroad tracks to Boston, New York is the very essence of real estate, the best, the choicest, the most soluble portions. If adequate restitution of the depleted store is not secured reduced productivity will result. Now this is a condition which must needs be guarded against; not by abandoning the market milk trade, but by seeking some method whereby that which is lost may be restored. Time was when institute speakers warned their hearers against the sale of hay, the sale of

milk, the sale of anything which removed plant food from the farm; when they stressed the advisability of selling butter instead of cheese or milk. Their point of view was not tenable. The economic situation in New England is such as to make Vermont inevitably a market milk state and to make milk sales at once necessary and advisable. These sales may be made for years to come if not for generations, provided the seller sells with both eyes open, with a full understanding of all the implications involved in the sales, clearly realizing that unless he replaces that which he reduces, he or his children or his children's children will reap the reward of a diminished income. He should grasp the modern notion that even though he owns an unmortgaged farm, still is he morally only a life tenant, obligated to hand it on to his successors with its productivity unimpaired.

Whence may the missing 40 per cent be secured? From the air, from the subsoil and, in a way, from the very soil itself. Clovers, alfalfa, soy beans, peas and their kindred, are important factors in the maintenance of the nitrogen balance of a market milk farm, because of their ability to fix atmospheric nitrogen and transfer to the soil in forms which feed the crop then growing as well as its successors. Furthermore, because of the fact that their roots are relatively deep and reach further down into the subsoil than do the roots of many of our agricultural plants, they are important factors in the translocation of plant food from subsoil to surface soil levels, thus making phosphoric acid, potash, lime and other forms of plant food which are normally out of reach available to the growth of various shallow rooted crops. The use of cover crops and catch crops which serve to lessen autumnal plant food drainage losses is highly advisable. And more thorough tillage will tend to increase the availability of the insoluble plant food actually present in the surface soil.

Plant food secured from the air and plant food drawn up from the subsoil represent direct gains; plant food held in the soil and prevented from passing into drainage waters represents an indirect gain, on the Benjamin Franklin principle that a penny saved is a penny earned; and insoluble plant food made available through thorough tillage, theoretically represents a loss but actually a gain.

Should Vermont continue to be a market milk state? Should its farms keep pouring their fertility into Massachusetts Bay and New York Harbor? Surely, until the day comes—it is coming fast—when milk powders and the like, already sold to a greater or less extent, take the place, in part, of market milk. I would not say nay if I could; and

I could not if I would. My plea is simply this—that the present occupants of market milk farms take thought of the morrow lest their condition a generation or two hence be such that their then occupants will feel like rising up and calling their predecessors cursed.

SOME OF THE MARKET PROBLEMS CONFRONTING THE FARMERS OF NEW ENGLAND.

F. S. ADAMS, CHIEF DIVISION OF MARKETS, DEPT. OF AGRICULTURE, STATE OF MAINE.

I am to speak about some of the market problems, which I think is one of the most important subjects that a group of farmers at this time can discuss, because if we move immense crops, without sufficient market machinery, they may not be handled very profitably. I saw statistics recently which I imagine were very nearly correct which said that 12,000,000 farmers and 2,500,000 traders and middlemen are engaged in the distribution and marketing of farm products, and the 2,500,000 are getting as much for marketing and distributing these farm crops as the 12,000,000 are for raising them. It is about a 50-50 proposition. That being the case there must be something radically wrong, and we farmers are largely to blame ourselves.

I believe that individual farmers cannot successfully sell their farm crops except in a very few instances in home markets, and that is not always done with a great deal of success. When you have a group of unorganized farmers selling in home markets, if there is a surplus, perhaps, a larger surplus than there may be immediate demand for in that market, these farmers selling, immediately begin competing against each other. They go into the market and find it well supplied, they are anxious to sell and offer their produce a little below the market, and that fixes the price. That goes on and on and on until the market comes down and the product is sold at less than the cost of production. I want to say also that farm produce is the only article sold without any regard to the cost of production. That was absolutely true as far as farm products are concerned until three years since we organized the N. E. M. P. A. Never in the history of New England farming has the farmer been able to say he is getting "cost plus a reasonable profit," for his products. The reason that manufacturers can get cost plus a reasonable profit is because they are organized. We used to say that competition is the life of trade. I do not think that is true now. Competition means excessive waste in the method of distribution and marketing. I am going to say and I think you will all agree with me, that to solve

the market problems, the first thing necessary is to organize. I used to think that the Grange might handle all these problems but have changed my mind in this respect. I do not think it can be successfully carried out except by groups of farmers organized to handle that special crop which they are raising, and I believe that is the position of the Federal Bureau of Markets. The men who are engaged in raising apples, that group of farmers should be organized especially to handle their special crop. The same is true of men engaged in raising potatoes.

Now the great question facing the farmers of New England is to get cost of farm products plus a reasonable profit. If I could assure the farmers of Maine that they could get cost plus a reasonable profit for their crops provided they had been produced under efficient management, I would guarantee we would increase production in Maine next year very materially.

We have two kinds of farmers' organizations, one organized for collective bargaining. Collective bargaining may not sound very attractive to the people at the present time, but I think you will agree with me, that labor organizations have gone far, far to the extreme in collective bargaining. Collective bargaining must carry with it efficiency in service. We do not ask for cost plus a reasonable profit, unless efficient service has been given, and I want to say that I believe the basis of fixing wages should be what it costs under efficient management to produce food. When you get off that basis you have a one-sided proposition and the result will be what we see now in New England, the young men leaving the farms because labor organizations are fixing prices without any regard to what it costs to produce food, in other words, we now have two standards of labor. We cannot work our farms on eight hours a day. It is impossible on a dairy farm, and practically impossible on any farm. The men work long hours, twelve hours, fourteen hours, but there is no reason why if the man who labors in the shop or in the ship-yards is going to have pay for overtime, pay and a half, there is no reason why the farmer should not also have pay for over time. Any other basis is going to get the world onesided. Abraham Lincoln said "this country could not exist part slave and part free," neither can we exist with two standards of labor. I am not pessimistic, I do not want to prophesy, evil, but if it continues, we will have a food shortage in this country, because the young men will not stay on the farms under these conditions, and you cannot blame them.

Collective bargaining is limited—collective bargaining

may be practical under favorable conditions by a small group of farmers within the limited area of production, but it would never work in selling potatoes or apples, because the potato grower is competing with the whole world, at least he was under normal conditions before the war. A group of farmers producing the milk for a city, that is what I mean by a limited area,—other parts of the country cannot well come into competition with them from the fact that milk being a perishable article must be produced not too far from where it is consumed, say within twenty-four hours' transportation, although the distance that the milk now is produced has gone very materially farther and farther into the country. As you will remember, not so very many years ago, Massachusetts produced most of the milk consumed in her large cities, and now the center of the milk supply of the great cities of Massachusetts is 220 miles from Boston, and for that reason a group of farmers producing market milk may organize successfully for collective bargaining. The N. E. M. P. A. is a collective bargaining organization. In a collective bargaining organization you cannot get away from the fact that the economic law of supply and demand is a most important factor in price fixing.

You know without my going into it the history of the N. E. M. P. A. We found when we organized that some things we guessed at were true, that there was no product, manufactured product, or product produced on the farm, that was sold under such a lack of system as milk. As a matter of fact the dealers had many different methods of buying milk, without any regard to the cost of production. They arbitrarily fixed prices, made a contract for six months, and set down in their office in Boston the price they would pay for milk, what they called the winter contract and the summer contract, without much regard to the cost of production. It was shown at an investigation before the Interstate Commerce Commission in the winter of 1915-16, by testimony from farmers and from county agents, that the farmers all over New England were producing milk at a loss. The first work of the N. E. M. P. A. was to work out a uniform standard for buying milk, a standard that the consumer could understand and so the quart was fixed as the standard on which to fix prices. The object of a standard that is familiar to the consumer was for a campaign of publicity so that the consuming public might be educated in the cost of producing milk and its value as a food. That is where the farmers have made a great mistake. We haven't been educating the consumer as to what it costs to produce farm product, and they have strange

ideas. In some of these large cities they seem to think that crops grow sort of spontaneous, that all we have to do is to go out in the fall of the year and gather in what we want and when we get tired stop—go out when it comes milking time and milk until we are tired, go in and get rested and then go out and milk some more, evidently by their attitude they think farm crops are of no value because I have seen automobile parties get out deliberately and pick up half a bushel of apples and put in their automobiles. I do not think that this applies to many people in the city. If we farmers go into the market to buy farm machinery or any supply needed on the farm, if the manufacturer of these supplies should say that he did not know what it cost to manufacture a certain farm machine, but he guessed it cost \$65.00 or \$70.00, we would be suspicious all the time that the manufacturer was asking too much. The same is just as true with farm crops. If you can tell the consumer what it costs to produce food on the farm under efficient management, they will be willing to pay cost plus a reasonable profit. The great trouble in the milk market of New England is the surplus, that is the "white elephant" so to speak. Now have in mind that there is no surplus of butterfat but there is a surplus of skim-milk and during 1919 while there was no surplus in the price fixing agreement for the months of November and December, yet the dealer had quite a surplus for those months, somewhere from fifteen to twenty per cent, and in price fixing this surplus has to be recognized. Some dietarians have figured it out that if the people of New England should consume what milk is necessary from a health standpoint, that would take care of the surplus and as is well known the N. E. M. P. A. has in cooperation with the dealers, inaugurated a campaign for advertising this product which has been very successful, notwithstanding the fact that milk has been constantly growing higher, the consumption has increased which I do not think is true of any other food product. One of the test methods of increasing the production of any product is to improve the quality, the better the quality the more the consumption. This is especially true of milk. That means that we producers want to see to it that milk is produced under good sanitary conditions and while at the farm is kept at a low temperature, which means a tank of water well iced. I do not believe the surplus plan worked out and adopted by the Federal Milk Commission for New England and under what we have been working, is satisfactory to anyone, in fact, it has all fallen to pieces. I do not believe that any plan will be satisfactory until the producers own the milk Stations

in the Country and are in a position to sell the dealers just what milk they want for their trade and the producers take care of the surplus back at the stations in the country near where it is produced. I understand that this method is in successful operation in some of the western states. This means the producer owning some of the market agencies. The surplus could be disposed of to better advantage if it was all handled through one agency. Under the milk Commission plan the dealer should handle the surplus without any profit, there is no great incentive to handle efficiently or economically, for what they get out of it; they had to pay back to the producer, minus what it costs to manufacture and sell it. This is the object of this Turner Center System which I will speak of somewhat in detail. The idea is to extend it to the country stations all over New England and perhaps sometime be able to own all of the machinery of marketing and distributing milk from the stable of the producer to the table of the consumer. While it had been expected that eventually this New England Milk Producers' Association must not only be used for collective bargaining but must also expand in such a way as to be able to provide marketing facilities for the dairymen of New England, these hopes during the year have rapidly approached realization in negotiations with the Turner Center Dairying Association. Plans have been completed and carried out so that this Association is now known as the Turner Center System and will be reorganized within the next five years on a strong, cooperative plan to be owned by the actual producers of dairy products in the territory served by the system. This creamery had its inception at Turner Center some 35 years ago at which time it was organized by the farmers as a cooperative creamery. Owing to difficulties and lack of support it had a narrow escape from complete suspension of business, but due to careful management and financial support from a few of the members, the business survived and has grown steadily from an annual income of \$20,217.26 in 1885 to \$4,759,814.62 in 1918. While the Turner Center Dairying Association has been practically a close corporation during the greater part of its existence, nevertheless it is doubtful if any other concern handling dairy products has succeeded to so great an extent in keeping the good-will and support of its patrons. Their method of buying milk and cream is proving to be one of the most just that has, as yet, been developed, the plan followed being to pay for the butterfat according to the market price of butter and in addition to the butterfat contents of the milk or cream to pay for the bulk of the skimmilk by the hundredweight, according

to its value in the market as fluid milk. While this is simple, it has proven to be at the same time elastic enough to adjust the price readily to market fluctuations and since its adoption by the Turner Center has been copied by many other concerns. Another plan which at first met with considerable opposition but which has later proven much more economical and satisfactory, was for each producer to own his own cans in which to transport milk from the farm to the skimming station, as by so doing the cans received better care and there was not such a heavy charge for loss. Another plan which has been particularly pleasing to the patrons and is now to be used in reorganizing the concern upon a co-operative basis is that of paying out a portion of the legitimate profits of the year's business to the producers in the form of a dividend according to the amount of milk or cream sold through the association. The rate paid in 1918 was three and three-quarters per cent. According to the plan of reorganization adopted, the system will have three classes of stock to be known as preferred stock, common stock, and cooperative stock. The preferred stock, as its name implies, is preferred only in a guarantee of interest and protection by the assets of the Company, but carries no voting power. The common stock is the now existing stock of the corporation and is to be retired by the proceeds from the cooperative stock to be issued. This cooperative stock will be issued in lieu of a trade dividend which has been paid to the producers for the last few years from the profits of the system and it is expected that this trade or cooperation stock in the next five years will retire all of the common stock now held by individuals. By this plan the producers will have voting power in the system on the basis of "one man, one vote," and the original owner of the stock only will be entitled to vote. Should he dispose of his stock to other parties it would carry no voting power. Following out this same plan, should it happen for any reason that all the now existing common stock should not be retired at the end of five years, it will carry no voting power, neither will it draw interest. While the plan has taken a great deal of time to perfect and many have criticized the slowness of the work, nevertheless the importance of the task undoubtedly justifies a great deal of care in working out the details. This has been exercised and the results promise to more than fulfill expectations.

A more economical method of farm distribution, and that is to my mind the most important subject of all. I think you will all agree with me that our method of distribution of farm products is wasteful and extravagant, is an

economic waste that is of no benefit to any one. For instance, I saw in some bulletin issued by the Department of Agriculture where the Bureau of Markets kept track of a veal calf raised in a town of Michigan that was shipped down alive to Chicago with a carload of stock and there slaughtered, and this carcass was reshipped and went back to the same town and the farmer that raised the calf bought a piece; and had it on his table. That is not entirely confined to Michigan. These same conditions are existing here in New England, shipping all our poultry and eggs, veal calves, and what little beef we do have, a large part of it goes to Boston, then to our hotels, and dealers send to Boston to buy it back. There is a reason for it. A man who is running a large hotel or a dealer who is doing a large business has got to be sure of a continuous supply and he cannot buy of a group of unorganized farmers who may have a veal calf to sell today because he will not know where he is going to get one tomorrow—or a chicken or some eggs. When the farmers are organized they can assemble their farm products in one lot and sell through one agency, and they can sell their produce without these two or three profits going to Boston commission men, brokers, etc., and the transportation back and forth. I believe that there is too much machinery between the producer and the consumer. If the farmers own part or all of this machinery, they may find that they can throw some of it on to the junk pile and the rest of it they can run more economically.

Perhaps you will say that the farmers are not able to do this, that they are not trained for it. I am going to take this stand, that if we can not develop leadership in our farmers' organizations to do this kind of work, we might as well give up farming in New England. They are doing it in the West, they are doing it in the South. They have an organization that handles their vegetables that they raise there for the early markets. They did an immense business this last year. And cannot we New England farmers do that? I say we can, and we are doing it, just as soon as we get established in business we develop leaders.

Perhaps you will say that the farmers are not able to and the consumer, I will give you a little illustration so that you may see what I mean a little more plainly. In our Farmers' Union in buying grass seed we deal with a western firm in Indiana and the farmers out there raise grass seed for that firm and we buy direct. We get an excellent quality. In the ordinary channels of trade they would sell their grass seed to a jobbing house and the jobbing house to a wholesale house which might be down here in Portland for

Maine, and the wholesale house to a retail store down where I live to Bowdoinham, and I would go down there and buy grass seed, which might and might not be good seed, but during that process there has been two or three commissions, and the wholesale house would have a drummer come down to Bowdoinham to sell them the grass seed. That has all been eliminated. It is an economical waste that is of no benefit to anybody. We are short of man power now. If we can eliminate some of this man power that is not necessary and put them on some job that is necessary, we shall have done a good thing for the country.

Last, but not least, I want to talk about standardization. We never can reach the full measure of success until we standardize more than we do now. We tried that somewhat in the war. We farmers have to make up our minds that we are going to give up some of our foolish ideas. I saw in the Country Gentleman that there are one hundred and fifty different brands of fertilizer manufactured in this country and it said that twenty-five brands would supply all the needs for all parts of this country. It told how much it cost to change one brand to another, and the saving the farmers could make, as every brand means an added expense for advertising and selling. I went into a warehouse down in Augusta where they keep all kinds of farm machinery, and they told me that they were carrying repairs for different farm mowing machines to the extent of \$5,000. I asked what would happen if the farmers should standardize? "Why," he said, "it would be the best thing that ever happened." Now, the different machines, there are hosts of them and they are practically all alike, they are all good machines. Let us standardize and have one mowing machine and call it the Farmers' Union. We have standardized on the automobile because we cannot afford to have anything but a Ford, and the result is you can go into almost any grocery store and buy your repairs for a Ford auto. You know what a host of brands of flour there were before the war, but during the war went down to one brand and that was mixed up with other kinds of grain too. Do you know what it costs to put these brands on the market? Pillsbury's brand, William Tell, Town Talk, and they are practically all the same, but there are a host of men going round traveling and advertising to put them on the market. A host of breakfast foods. Why these big concerns, these big packing houses will spend a million of dollars to put a breakfast food on the market. A bushel of corn made into corn flakes sells for \$60.00, and about all the food value there is in it is what cream and sugar you

put on it. I do want to say before I close that I am proud to see that the farmers of New England are making notable progress in farmers' organizations. Vermont is first in membership in the N. E. M. P. A., Maine stands second in membership. This Association has increased since January 1st over 7,000. It comes easier now that the farmers have awakened to the fact that it has been of some benefit to them.

BOSTON MILK CAMPAIGN.

P. M. HARWOOD, GENERAL AGENT, STATE DEPARTMENT OF AGRICULTURE.

For a long time the food value of milk was not appreciated and but little attention was paid to the matter. In 1910 at the request of the speaker, Professor Washburn of Vermont, was invited to come to Massachusetts and deliver a lecture upon the subject at the public Winter Meeting of the State Board of Agriculture held at Northampton. His remarks were so well liked that he was asked to repeat the lecture at a meeting of the Cattle Owners Association held a few weeks later in Worcester. From that time on the Dairy Bureau of the Massachusetts State Board of Agriculture, the work of which I had personal charge, waged an active campaign by means of lectures and literature. Millions of copies of folders and leaflets relating to milk and milk products have since been published and distributed.

Meanwhile, Dr. E. V. McCollum's great discoveries had been made and the results spread broad-cast throughout the world. War-time conditions aroused many people to consider the food value of milk and milk products. All of this helped in laying a good foundation for the Boston Milk Campaign.

In New York City, in 1917-18 two large milk and milk-farm expositions were held. Early in the summer of 1918, it was thought wise to hold a similar show in Boston. Interested parties were called to consider the matter. An organization was established and the proposition was well underway when owing to what seemed to be insurmountable obstacles the project was abandoned.

In the spring of 1919 information came to us that the producers and dealers would finance a milk advertising campaign on a fifty-fifty basis and other individuals and organizations could contribute either money or services as they saw fit. All parties interested were again called together and an Executive Committee which finally resolved itself into three managing members,—Dr. A. W. Gilbert, chairman; Mr. Delos L. James, campaign manager, and myself. The United States Government at the outset had a number of paid workers in the State including Mr. James, who was also paid in part by the Extension Department of the Massa-

chusetts Agricultural College, and the aid of these was promised.

The State Department of Agriculture promised to contribute literature in large volume, strong in the belief that the milk consumer would be more benefited than any others by such a campaign, because of physical as well as financial benefits which invariably result from the use of sufficient milk.

Then too, there is the necessity for revitalizing the waning dairy industry in New England which in turn reacts in favor of the consumer by better agriculture giving greater crops and ultimately cheaper food. Money spent for milk at a liberal price is like bread cast upon the waters returning after many days.

The Boston Chamber of Commerce acted as treasurer, all the money collected being handed over to that body by whom all bills were paid later.

The following organizations contributed additional aid in one way or another: Boston Board of Health; National Civic Federation; Women's Municipal League; Special Aid Society; New England Home Economics Association; Boston Committee for Public Service, Diabetic Bureau League for Preventive Work; Brookline Health Centre; Boston Social Union; League of Catholic Women; Salvation Army; and others, co-operating.

The campaign opened in June 1919, first with a large corps of paid workers, but later on account of lack of funds on the part of the United States Government, the number of workers was reduced to two (from July to November) and later was increased to six exclusive of Mr. James and a publicity man.

One of the workers, Mrs. McCrillis, wrote a play entitled "Milk Fairies" in which milk constituents were personified. This play was so popular that the author was asked to attend the recent National Dairy Show held at Chicago and put on the play there which she did to the great satisfaction of all concerned.

A large amount of newspaper advertising has been carried on. Street cars have been placarded with "Use More Milk" signs; posters have been put up in public places; hundreds of thousands of copies of "Milk as a Food" literature have been distributed, some of which were printed in the Polish, Italian and Yiddish languages furnished by the State Department of Agriculture. The dietitians have gone forth into schools, workshops, mothers' clubs, etc. with their message. The type of audiences reached were parents' associations; mothers' clubs; factory employees; store em-

ployees; nurses; physicians; dietitians; students; playground supervisors; school principals; school teachers; school children; girl scouts; boy scouts; sewing, cooking and garden classes; day nursery groups; settlement house groups; nutrition classes; women's clubs; social workers, etc., etc.

Six hundred nineteen talks were given and the number of people reached from June to December through this medium was 179,035; by posters and literature distributed at these meetings 561,380; school children reached in Somerville, Quincy and Boston 124,406; dairy groups, mothers' clubs, nurses, dietitians, school workers, factory employees, women's clubs, etc., 34,584; the number reached by newspaper advertisements estimated some millions.

A special effort was made on October 24 and 25 to awaken new interest by holding milk conferences on Friday night and Saturday A. M. when school teachers and other interested workers could be present. The program for these meetings was carefully prepared with a view to covering the ground in a brief yet thorough manner. The subjects to be discussed were first selected and then the best authority in each was asked to present them. The following program speaks for itself:—

Milk Conference

October 24 and 25, 1919

Boston, Mass.

Friday Evening, 8 P. M., Ford Hall

Ashburton Place

Dr. William Woodward, Presiding

Health Commissioner, City of Boston

Opening Address

Governor Calvin Coolidge

Milk Fairies

Play by Charlestown Playground Children

Dairy Situation of New England

Dr. A. W. Gilbert—Boston Chamber of Commerce

Milk as a Growth Promoter

Dr. E. V. McCollum—Johns Hopkins University

Saturday 10 A. M., State House Auditorium

Dr. A. W. Gilbert, Presiding

Milk for the Industrial Worker

Miss Bertha Wood—Boston Dispensary

Milk, the Indispensable Food for Children

Dr. Dorothy Reed Mendell—Childrens Bureau,

U. S. Dept. Labor

Safeguarding the City Milk Supply

Dr. James O. Jordan—Health Dept., City of Boston
The Dairy Cow—Our Foster Mother
M. D. Mum—Pres. National Dairy Council

This conference has been arranged under the auspices of the Boston Milk Campaign and co-operating agencies; the purpose being to show why milk is a vital factor in public health and economical living.

The cost of the campaign to December 8, 1919, was \$23,383.39 out of \$26,494.24 of money contributed exclusive of the gratuitous work done by the several organizations before mentioned.

During the address Mr. Harwood quoted liberally from the various types of literature used in the campaign, showing the original illustrations of food nutrition, fuel equivalent, protein equivalent, bone-building material and growth promotion.

He quoted the following from his own milk leaflets:—

"MILK FACTS.—Milk is cheap, nutritious, easily digestible, the best food for babies (mother's milk excepted), and should form the major portion of the child's diet up to school age.

The kind and quality of milk best suited to a child varies with the individual. The average school child should consume at least two glasses per day. Many adults would be benefited by the use of more milk and less meat. No other single food product is at once so nourishing and digestible for both infants and adults.

Milk and milk products at present prices furnish more nutrition for money expended than do meats.

The more milk in whatever form a family consumes, the less meat will be required and the more money will be saved.

Milk-borne diseases are far less common than the ill effects which result from the use of too little milk.

The consumption of milk can be greatly augmented by increasing the use of cooked foods of which milk is a component part.

If human efficiency is to be raised to its highest level, more milk and milk products must be consumed by the American people.

As a food producer the dairy cow excels all other animals.

A price sufficient to return a profit to the dairymen is necessary in order to secure a permanent and adequate milk supply.

If the world's food supply is to be increased or even maintained, the dairy cow must be supported."

"Man shall not live by bread alone," Matt. 4:4. Bread is called the 'staff' of life. A staff merely supports; to sustain something else is needed. *Milk supplies it.*

Bread may be made from wheat, rye, oats, barley or corn, or from a mixture of any of these incomplete foods, but if milk or skim milk is used in mixing and *real butter*, not imitation butter, is then spread upon the finished product, a complete food results.

Or if bread is served with whole milk and excellent meal is furnished.

The addition of *full cream cheese* in either case furnishes a still heartier meal."

"The dairy cow is the greatest animal food producing machine in the world. Take, for example, a cow weighing 1,000 pounds while in milking condition. Good dairymen do not consider a cow worth keeping unless she gives 6,000 pounds or more of milk per annum. A cow weighing 1,000 pounds and yielding 5,000 pounds of milk per year produced 5 times her own weight, and if she is kept 5 years, twenty-five times or 10 years, fifty times her own weight in a food all of which is digestible, and all of which is not only the most *complete* food known, but is also the *least expensive* among foods of animal origin. When such a cow is slaughtered she yields from 500 to 600 pounds of light beef, a considerable percentage of which is bone and tendon.

As a food, Milk is an *absolute necessity*, in the diet of growing children, as well as in supplementing the deficiencies which occur in the daily diet of adults. When dairy cows are slaughtered and sold for beef because of insufficient demand for *milk*, and are not replaced by younger or better cows, a near public calamity results.

To produce steer beef requires 2½ to 3 years;

To produce baby beef requires 6 to 8 months;

To produce veal, requires 6 to 8 weeks;

To produce milk requires 12 hours."

"USE BUTTER.—In butter substitutes, the usual bases are tallow, lard and vegetable oils. Each of these has a value and use of its own. Comparison with butter on the basis of calory units does not suffice, palatability, adaptability, digestibility, and the accessory substances causing growth promotion must all be considered. No substitute is

"just as good". One would not use these fats and oils in making ice cream, nor would one use either animal-body or vegetable fats for feeding young children, or even very young animals if best results are desired. Practical experience and observation prove the superiority of *milk fat* as a food whether consumer be adults or children. Dr. E. V. McCollum of The Johns Hopkins University has done much in furnishing *scientific proof* along these lines. Lard and tallow are well adapted for purposes of shortening and frying, and vegetable oils for salads and condiments, but when these fats and oils are processed and later manufactured into butter substitutes, thereby greatly increasing their cost, it may well be questioned whether the purposes of real economy have been served."

RESULTS.

A few of the notable results are interesting:—During the first four months 2,000,000 quarts more of milk were sold by our larger dealers than for the same period last year.

SCHOOLS.—A number of the school principals are furnishing the milk at cost, arrangements having been made with certain dealers to furnish paper drinking cups.

Many favorable reports have been sent in to the office. Teachers report that those children who drink more milk at recess time show mental and physical improvement. They are more alert and their posture is improved.

STORES.—In Gilchrist's Department Store, the workers were using 70 bottles of milk daily. After a series of talks by our specialists, the number of bottles used increased to 300.

In R. H. White's store, the workers were using 40 bottles of milk daily and increased to 160 after our talks.

In the Jordan Marsh store the sales of milk increased 50% among the employees after our talks.

FACTORIES.—At the United Drug Co. factory about 500 people are served in the dining-room. At this place, the use of milk increased 400% in one month; on one day recently 457 people were served and of these 370 drank milk. These results can be duplicated in other institutions by continued informative talks.

Dr. A. W. Gilbert, former milk administrator of Boston, at present Commissioner of Agriculture, of Massachusetts, than whom no person is better qualified to judge, estimates the increase of milk consumption in Greater Boston to be at least 15% due directly to work of this campaign.

BUSINESS MEETING.

At the Annual Business Meeting of the Association the following officers were elected:—

PRESIDENT,

S. L. Harris.....Proctor

FIRST VICE PRESIDENT,

E. C. Hillis.....East Montpelier

SECOND VICE-PRESIDENT,

G. H. Terrill.....Morrisville

SECRETARY,

O. L. Martin.....Plainfield

TREASURER,

W. H. Harrington.....North Pomfret

AUDITOR,

F. L. Davis.....Hartford

THURSDAY EVENING.

BANQUET.

With Congressman Frank L. Greene as toastmaster and Joe Mitchell Chappel as chief speaker of the evening, the three day Annual Meeting of the Vermont Dairymen's Association came to a close in a burst of glory at the annual banquet in the dining room of Hotel Vermont, Thursday evening. Three hundred and fifty guests filled every available space in the dining room and the banquet overflowed into the lobby during the speaking. The crowd was in a pleasant mood and sang popular songs, led by the strains of the Van Ness orchestra. On the entrance of Congressman Greene and Mr. Chappel they were greeted with cheers of approval. Other speakers in the post-prandial exercises were Lieutenant Governor Mason S. Stone and Dean Hills of the Agricultural College of the University of Vermont.

Mr. Chappel's talk, altho' it had no particular title might well be called "Heart Throbs from Personal Glimpses of the War". His story of his experiences in France as a war writer and lecturer, his personal recollections of famous personages, his glimpses of the horrors and the glories of the fighting area, of the sickness and suffering and sacrifice, of the gratitude of the French people and the steadfastness of the American soldiers and sailors,—pictured as only Joe Mitchell Chappel could picture it, stirred his audience to the depths, bringing laughs and tears in the same breath. He said in early life he discovered that people wanted to know about people and so he has been learning about people and telling people about people ever since. Mr. Chappel told of knowing President McKinley intimately and of the President detailing Chappel to show Prince Albert of Belgium America when he visited this country 20 years before the war. When the war came Chappel finally persuaded the authorities to allow him to go to Europe as a newspaper man. Then came sketches of his impressions, vivid and compelling; his trip to Paris, the air raids; his visit to Pershing on the darkest day of the war, March 21, 1918, when the Germans were driving toward Paris; his trip to the front, the flags waving and the boys going by in miles upon miles of marching men, including the 26th Division; the little French children rushing to kiss their foot prints

after they had passed; Neuf Chateau, Joan of Arc, scenes of "Transcendent Glory." "Those are the men who know what it means to be an American citizen in the fullest sense of the word", said the speaker in referring to the American Dough Boys. He described the meeting with Clarence R. Edwards, "The man who was loved by every man who fought under him"; then came vivid pictures of cooties, the Salvation Army doughnuts; a Red Cross Hospital ablaze and a Red Cross nurse, trying to rescue a patient, killed by the German bombs and falling across the Red Cross emblem which marked the hospital on the grounds; then back to Paris; to Rome and an evening in the box of the Ambassador followed by an experience in making a speech as the American representative at an Allied meeting where the audience was practically all Italian and he could not speak Italian; his trip in the limousine of Orlando with D'Annunzio; then back to Laon, France; his meeting with Clemenceau, Folk, Sir Douglas Haig and then, greatest of all, the meeting with Albert, King of the Belgians, 20 years after he had guided him about America as Prince Albert.

With Admiral Sims, Chappel visited the fleet of 76 miles of battle ships, the bulwark of the Allied nations. During his stay in France Chappel spoke to 250,000 soldiers in front line trenches. Then came peace and the armistice, Germany untouched and smiling a welcome to the conquerors. He described visits to President Poincare, to President and Mrs. Wilson and to Ambassador and Mrs. Sharp; then the first meeting of the representatives of the Allied nations. Then came his visit to Germany with the American Army of Occupation, his visit to the grave of Quentin Roosevelt and finally back with the boys to "Home Sweet Home".

Lieutenant Governor Stone and Dean Hills spoke briefly, the former commending the great advances which agriculture has made in Vermont during the last few years and predicting much greater improvements during the next 20 years. Dean Hills told the Dairymen that the doors of the University of Vermont were always open to them whenever they wished to come for meetings or otherwise, that the buildings belonged to them as much as to the college authorities, and that it was hoped that the Annual Meeting of this organization might be held at the University yearly.

Congressman Greene closed the evening's program by telling briefly of the great danger that is threatening the country at the present time and warned against it. He said that he was not so much afraid of open and avowed enemies of the government, the Reds and Radicals and Bolsheviks,

but he did fear the altruistic high brow element that is creeping into our country, even into our school books and our homes. It is not so much those who are openly defying the government that we must watch. We can meet them with machine guns but we need to watch those who are half-hearted, our neighbors who are ready to compromise on some things.

"This is no time for compromise with the flag and all it stands for", declared the Congressman, "if we compromise, we are lost".

Men are preaching the insidious doctrine that we can live without work. The Radical, the Compromiser, the Parlor Bolshevik. Greed for the almighty dollar must be controlled. It is greed which is our eye sore, which brought cheap labor to this country and secluded it in certain districts which have become hotbeds of crime, simply because our own people would not do our work for the wages which these foreigners would. This is a good time to stick to the old constitution", said the speaker and to remember the words of St. Paul, "Prove all things; hold fast that which is good." Congressman Greene's closing words were, "Let us keep in the faith of the fathers and ride in a safe anchorage of the past". He then called upon the audience to rise and sing two verses of America which closed the meeting.

THE WOMAN'S AUXILIARY.

A delightful reception was tendered the ladies of the Woman's Auxiliary at Grass mount, Wednesday afternoon from 4 to 6 o'clock. An enjoyable musical program was given after which tea was served and the ladies enjoyed the pleasant social hour which was made possible for them by Mrs. Guy Bailey, Mrs. Pearl Randall Wasson and other ladies connected with the University.

The meeting of the Dairymen's Wives and Daughters which was held at the roof garden on Hotel Vermont January 15, 1920 was well attended and very interesting.

After a half hour concert by the Van Ness orchestra, Mrs. F. H. Bickford, the retiring president gave an address in which she said "The war has given the women of the world a terrible jolt and they probably will never again return to their old positions and habits." One of the missions of women is to make the world in which we live, a better place for women and children." She advocated enforced medical inspection to help the men and women of the future. She thinks women have got to take a part in the affairs of the world and now realize that to be an American citizen is the greatest thing in the world. She said "Citizens do not happen, they are the products of training. We must meet all these problems by working together for a definite object."

Mrs. G. H. Smilie of Montpelier told of the new plans of the Vermont division of the War Savings Committee of which she is director. She advised returning to the idea that it is immoral to waste money and explained how the present high cost of living was due to extravagant tastes in buying.

Lieut. Gov. Mason S. Stone gave a talk on the Country which he says, is the place of real homes where true men and women may be raised. Vermont is a rural community and so a State of homes. He told of traveling thru Alaska, Borneo, Central China, England and France. The homes in those countries have no true life. In cities, he said, "You can have Dissipation without pleasure, acquaintances without friends, nearbys without neighbors and habitants without homes". "In the country every one lives in the spot light and there can be nothing superficial in the lives of anyone."

A business meeting followed when \$5.00 was voted to the State Federation Scholarship Fund.

Mrs. Bickford positively refused the re-election as president so a rising vote of thanks was given her for her eight years of faithful and efficient services in that capacity.

The following officers for the next two years were elected:—President, Mrs. H. K. Brooks, St. Albans; Vice-President, Mrs. H. M. Farnham, Montpelier; Secretary and Treasurer, Mrs. H. J. Wright, St. Albans.

Adjourned for one year.

MRS. H. M. FARNHAM,
Secretary.

ANNUAL MEMBERS 1920.

Atwood, T. H.	Burlington, R. D. 1
Addy, R. H.	Burlington Box 71
Allen, Henry A.	Burlington, 72 Monroe St.
Ashley, Alton B.	Essex Jct.
Bryan, A. E.	Northfield
Brigham, H. S.	St. Albans
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Bachelor, W. E.	206 Chamber of Commerce, Boston, Mass.
Carpenter, T. C.	Passumpsic, Vt.
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Cartwell James R.	Middlebury
Chapin, G. W.	Hospital Farm, Burlington
Cook, N. Wyatt.	Mt. Holly
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Coburn, Harry	E. Montpelier
Cullen, J. W.	618 Tremont Bldg., Boston, Mass.
Conant, J. F.	185½ College St., Burlington
Clewley, E. G.	Burlington
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Darling, E. A.	E. Burke
Eschenhimer, R.	Waterbury
Ellis, H. J.	Huntington
Ellsworth, K. L.	Jeffersonville
Foote, F. E.	Middlebury
Eastman, M. G.	Lyndonville
English, L. W.	Woodstock
Green Mt. Creamery.	No. Craftsbury

Gordnier, G. A.	Troy, N. Y.
Gardiner, E. L.	165 Broadway, N. Y. City
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Grant, T. P.	9 Fulton Place, Boston, Mass.
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Hoyt, E. S.	So. Hero
Hill, P. G.	Burlington
Haire, W. J.	30 So. Market St., Boston
Hoskinson H. W.	Cuttingsville
Howe, F. B.	Burlington
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King, L. A.	E. Corinth
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Lamoille Cry. Assn.	E. Hardwick
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Millar, F. J.	Newport Center
Marble, C. H.	330 So. Market St., Boston
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Prindle, S. M.	St. Albans
Pierce, West M.	St. Albans R. D. No. 2
Payne, A. J.	Burlington
Rist, F. A.	Wilmington
Reynolds, J. W.	St. Albans
Rice, F. H.	Burlington
Richards, C. V.	Box 1123, Hartford Conn.
Ross, H. F.	So. Union St., Burlington
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Shepardson, E. E.	152 Lowell St., Somerville, Mass.
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Small Bros.	Richford
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Scott, H. M.	48 Monroe St., Burlington

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Slater, I. C.	Essex Jct.
Somes, L. N.	150 Nassau St., New York City
Smith, Clyde N.....	Brandon
Stockwell, Geo. W.	So. Weymouth, Mass.
Thompson, M. E.....	Colchester
Thompson, W. A.....	Essex Jct.
Thompson, H. A.....	360 No. Ave., Burlington
Thurlow, H. A.....	148 State St., Boston
True, H. E.....	49 No. St., Foxcroft, Me.
Tilton, F. M.....	Calremont, N. H.
Talbert, E. J.....	Barre
Wilkins, G. A.....	Morrisville
Warner, W. K.....	St. Albans
Walker, J. E.....	Schenectady, N. Y.
Whitcomb, E. M.....	Essex Jct.

LIFE MEMBERS OF THE VERMONT DAIRYMEN'S ASSOCIATION, 1920.

A

Armo, R. A.....Williston
 Alden, B. H.....Orleans
 Adams, G. H.....South Barre
 Adams, M. A.....Derby
 Allen, Charles.....East Berkshire
 Allen, H. A.....West Milton
 Allen, Henry.....Pawlet
 Adams, William H.,
 369 Marlboro St., Keene, N. H.
 Aseltine, M. L. Springfield, Mass.
 Aldrich, E. O.,
 R. F. D. No. 2, Clarendon
 Allen, G. A.,
 R. F. D. No. 2, West Brattleboro
 Allen, F. E.,
 R. F. D., South Royalton
 Ansboro, J. E.....Derby

B

Baker, O. W.....Concord
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 Badger, C. A.....Williamstown
 Burnett, R. E.....North Pomfret
 Burbank, J. A.....North Pomfret
 Burr, L. R.....North Clarendon
 Brownell, C. W.....Burlington
 Brigham, William O.....Bakersfield
 Burt, William.....Essex
 Blair, N. B.....Morrisville
 Bliss, Abner.....Georgia
 Bates, A. E.....Huntington
 Brown, J. S.....Plymouth
 Bishop, D. B.....North Williston
 Byington, C. M.....Charlotte
 Bigelow, A. P.....Middlesex
 Burke, J. E.....Burlington
 Burnham, W. F.....So. Royalton
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 Beach, H. F.....R. F. D., Vergennes
 Brooks, H. K.....St. Albans
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 Burnett, E. A.,
 University, Lincoln, Neb.
 Bond, John.....East Montpelier

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 Bass, E. L.....Randolph
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 Barry, Leonidas.....Springfield
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 9 Chatham St., Boston, Mass.
 Bean, G. C.....Coventry
 Belden, H. W.....Waitsfield
 Bickford, F. H.....Bradford
 Buxton, J. E.....Middletown Springs
 Brock, L. F.....Barnet
 Barber, E. L.....North Williston
 Bushnell, H. N.....Waitsfield
 Burrell, D. H.....Little Falls, N. Y.
 Bigelow, A. P.....St. Johnsbury
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 Bristol, E. S.....Vergennes
 Bellows, F. A.....No. Ferrisburg
 Boyden, C. F.....Randolph Center

C

Curtis, H. B.....St. Albans
 Conn. Agricultural College,
 Storrs, Conn.
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 Cushman, G. L.,
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 Congdon, Edwin.....Clarendon
 Cahes, L. J.....Brandon
 Cook, Nelson P.....Mt. Holly
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 Clarke, F. H.....Williston
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 Cowdon, H. St. Johnsbury
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 Colburn, R. M. Springfield
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 Chase, Perry East Fairfield
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 Clark, Homer F. Charlotte

D

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 Dana, E. J. North Pomfret
 Donahue, J. F. Vergennes
 Doe, G. A. Newbury
 Dutton, F. B. Woodstock
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 Donahue, W. F. Ferrisburg
 Dodge, Harrison Morrisville
 Donahue, D. G. East Charlotte
 Davis, George F. Cavendish
 Darling, E. L. East Burke
 Davis, G. N. Castleton
 Downer, Charles Sharon
 Davis, C. H. E. Healdville
 Davis, F. L. Hartford
 Dagon, M. R. Madison, Wis.
 Dreman, R. E.,

State College, Ames, Iowa
 Dodge, L. B.,
 300 No. Main St., Barre
 Davis, Geo. H. Hubbardton
 Dunsmore, Geo. H.,

R. F. D., St. Albans
 Dunklee, A. A. So. Vernon
 Darling, W. W. Boston, Mass.
 Dewey, James F. Quechee

E

Eldred, H. S. Sheldon
 Ellis, I. L. Middlebury

Edson, A. A. Burlington, R. F. D.
 Eddy, C. F. Stowe
 Ellis, Edward A. Castleton
 Estee, James B. Montpelier

F

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 Washington, D. C.

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155 Loomis St., Burlington
 Flint, J. P. Montpelier

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 Farrington, C. W. West Danville

Fletcher, William Essex Junction
 Fisher, D. W.,

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 Ferson, B. W. Goshen, N. Y.

Fassett, B. F. Enosburg Falls
 Fassett, W. G. Enosburg

Fuller, C. C. Jonesville
 Fowler, F. E. South Royalton

Fletcher, Ex-Gov. A. M., Cavendish
 Fraser, W. J. Urbana, Ill.

Fillmore Farms Bennington
 Fuller, B. J. Williston

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Fuller, W. C. Richmond

G

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 Grout, L. D. Morrisville

Grout, J. Ex-Gov. Derby
 Gloyd, Jesse Richmond

Gilman, A. A. Randolph Center
 Goodspeed, Nelson St. Albans

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 Giddings, F. L. Orwell

Greene, G. F. So. Pomfret
 Gates & Son, Charles

North Hartland
 Gale, J. E. Guilford

Goss, W. G.,
 R. F. D. No. 4, St. Johnsbury

H

Howie, A. F. Mrs.,
 Elm Grove, Wis.

Hewitt, J. D. North Pomfret

Hill, W. N. Starksboro
 Hathaway, F. M. St. Albans Bay
 Hooper, V. A. Blockton, Ark.
 Hastings, S. J. Passumpsic
 Harvey, Cloud Barnet
 Hills, J. L. Prof. Burlington
 Hayward, G. M. Middlebury
 Heller & Merz Co.,
 505 Hudson St., New York City
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 Hefflon, Franklin. Highgate Center
 Hutchinson, William. Norwich
 Hill, H. C. Isle La Motte
 Hillis, E. C. North Montpelier
 Howard, Ernest S. West Hartford
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 Herrick, A. A.,

R. F. D. 2, Milton

Hall, Charles. Montpelier
 Head, George G. Montgomery
 Harwood, J. W. Orwell
 Hewitt, Stephen. North Pomfret
 Hoadley, A. E. South Woodstock
 Howe, W. H.,

R. F. D., South Royalton

Hayes, J. R. Stafford
 Hitchcock, Ernest Pittsford
 Higley, Nathan Richmond
 Hodges, R. W. Springfield, Mass.
 Harwood, Burr,

R. F. D. 1, Salem, N. Y.

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 Huntley, George M.,

R. F. D., Fairfax

Hopkins, Hermann, Jr.,
 Sheldon Jct.

Harrington, W. H. North Pomfret
 Hyde, Wheeler & Co.,

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17 Union St., Springfield

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 Heath, W. E. Sharon
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 Hood, C. H.,

494 Rutherford Ave.,

Boston, Mass.

Howe, E. L., R. F. D. So. Ryegate
 Hazard, G. M. Charlotte
 Hewitt, Mary No. Pomfret
 Howard, E. S. W. Hartford

I

Iowa State Library,
 Des Moines, Iowa
 Isham, Ed. St. George
 Irish, V. H. Enosburg Falls

J

Jones, E. H. Waitsfield
 Jackson, L. A. Hartford
 Jackson, J. J. Fair Haven
 Judd, Morton Windsor
 Jaynes, R. F.,
 65 Central Ave., Lynn, Mass.
 Jewett, A. & Son. Middlebury
 Jones, G. M. Waitsfield
 Jenne, A. M. R. F. D., Richford
 Johnson, C. C. Pomfret
 Jennings, B. C. E. Hardwick
 Jewett, Alden H. Williamstown

K

Kelley, G. A. Underhill
 Kingsley, C. J. West Salisbury
 Kingsley, H. E. Montgomery
 Kinnerson, J. R. Peacham
 Kidder, N. D. Hastings, Neb.
 King, M. D. Woodstock
 Kneeland, D. A. Waitsfield

L

Leonard, Geo. Brandon
 Lilly, J. O. Plainfield
 Lyster, T. H. St. Johnsbury
 Lawrence, Henry St. George
 Lawless, C. G.,
 North Haverhill, N. H.
 LePage, Charles Barre
 Loveland, J. H. Norwich
 Leary, J. A. Jericho
 Leonard, W. B. Orleans
 Lewis, M. J. Woodstock
 Lewis, A. L. Rochester
 Lilley, C. M. Marshfield
 Leonard, C. H. No. Pomfret

M

McCuen, R. W. Vergennes
 Maynard, A. S. Bakersfield
 Marvin, Thomas Montpelier
 Mosely, F. W. Clinton, Iowa
 Messer, F. A. Greensboro
 Moore, A. A. Richford
 Maxham, G. R. Woodstock
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 R. F. D., No. 2, Burlington
 Milligan, F. B. Walden
 McMahon, C. L. Stowe
 McLam, J. F. So. Ryegate
 Macomber, F. H. Shelburne
 McNall, J. M. Milton
 McGaffey, E. E.,

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 Boston, Mass.

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 Melvin, A. D., Chief of Bureau
 Animal Industry,
 Washington, D. C.
 Mass. Agricultural College,
 Amherst, Mass.
 McDonough, P. M. Hinesburg
 McCauley, D. F. Shoreham
 Martin, O. L. Plainfield
 McLam, G. E. Topsham
 Moody, Mark L. Waterbury
 Metcalf, R. H. Stowe

N

Nelson, David,
 34 Allen Ave., Springfield, Mass.
 Newton, C. H. Fargo, North Da.
 Nay, Y. G. Jericho
 Northrup, P. B. B. Sheldon
 Newell, Bigelow Stowe
 Nute, Byron,
 Marvin, Mass., R. F. D. 1
 Newton, W. D.,
 R. F. D., St. Albans

N. H. Agricultural College,
 Durham, N. H.
 N. Y. State Library... Albany, N. Y.
 Noyes, E. H. Sharon
 Noyes, M. C. Sharon

P

Plummer, E. G. Groton
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 Perry, E. B. & Son..... Ira
 Page, C. S., Ex-Gov. Hyde Park
 Powers, William Brandon
 Perry, S. E. South Pomfret
 Pierce, J. H. Franklin
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 Pierce, C. C. East Clarendon
 Place, R. H. Essex Junction
 Perkins, W. E. Pomfret
 Palmer, George New Haven
 Palmer, C. E. New Haven

R

Richardson, A. E. Burlington
 Rie, Eli West Charleston
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Roberts, D. W. West Hartford
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 Roberts, L. J. Waterbury
 Ruggles, E. H. Westford
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 Waddington, N. Y.

Ricker, N. H. Ryegate
 Russell, F. L. Cuttingsville
 Ridlon, M. R.,
 R. F. D., Cuttingsville

Robbins, H. E. Derby
 Ryan, D. E. Orwell
 Roberts, G. V. Milton
 Roundy, Charles C.,
 136 Paine St., Worcester, Mass.

S

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 State Dairy Bureaus,
 State House, Boston.
 Shackford, Mrs. C. J. Nelson,
 Ryegate

Stone, W. P. Strafford
 Sawyer, A. G. Groton
 Spear, V. I. Randolph
 Strong, P. W. North Pomfret
 Slocum, A. R. South Burlington
 Stanhope, Spencer,
 Berkshire Center

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 Board Trade Building,
 Boston, Mass.

Small, Fred M. Morrisville
 Stevens, N. C. West Glover
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 Smead, C. D. West Brookfield
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 Smith, E. L.,
 Mirades District,

Lindsey, Tulare Co., Cal.
 Spaulding, L. C. Poultney
 State Library..... Concord, N. H.
 Sherburne, A. E. North Pomfret
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 Staples, Rev. C. J.,
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Burlington
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 Boston, Mass.

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 Smith, George G. St. Albans
 Simpson, W. G. So. Ryegate
 Smith, F. L. Fletcher
 Sowles, E. A. St. Albans

Smith, E. C., Ex-Gov. St. Albans
Sprague, N. T. Jr.,

Brooklyn, N. Y.
Strihues, J. J. Randolph
Snow, Mrs. Edward,

Swanzey, N. H.
Sprague, George K.,

East Brookfield
Swan, P. B. Montgomery

Scarff, C. W., Col. Seattle, Wash.
Sellew, Robt., P.,

7 Merchants Row, Boston, Mass.
Sudendorf, E.,

412 E. Monroe St.,
Springfield, Ill.

Stone, M. S. Montpelier
Stone, E. A. Williamstown

Seaver, W. H. Taftsville
Somers, C. L. South Peacham

Smith, E. E. West Rutland
Sisson, Ellsworth,

P. O. Box 1176,
Providence, R. I.

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The Jewish Farmer,

17 Second Ave.,
New York, N. Y.

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Turnbull, J. G. Orleans

Tarbox, C. Jericho
Towle, E. R. Enosburg Falls

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Tarbell, E. S. Montgomery

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Tottingham, L. H. Shoreham

Talcott, D. L. Williston
Talcott, L. F. Williston

Talcott, J. R.,
1760 High St., Oakland, Cal.

Talcott, Frank Williston
Tarwell, F. Hampton, N. Y.

Terrill, A. N. Morrisville
Temple, G. H. Randolph Center

Towle, W. W. Enosburg Falls
Trescott, A. J. West Rutland

Tracey, J. E. Burlington
Tear, Frank. R. F. D., W. Rutland

U

Union Association Press,
47 Ann St., New York

V

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Varney, W. M. Vergennes

W

Washburn, R. M.,
University Farm,

St. Paul Minn.
Willard, E. G. No. Hartland

Warren, L. H. North Pomfret
Willey Bros. Cambridge

Ware, O. T. Brattleboro
Whitcher, J. R.,

R. F. D. No. 3, Groton
Williams, W. H. Rutland

Wright, Will W. Brandon
Wheeler, N. B.,

Bakers Mills, N. Y.
Wry, I. A. St. Albans

Washburn, Chat. Brandon
Williams, N. G. Bellows Falls

Walker, N. S. Clarendon Springs
Woodward, J. S. Enosburg

Winslow, H. L. North Clarendon
Weed, E. D. Hinesburg

Warren, Rufus Montpelier
Wheelock, H. R. Montpelier

Wright, J. J. So. Hero
Whipple, Obed Jr. North Pomfret

Wheeler, F. H. Proctorsville
Whitney, Ed. Minneapolis, Minn.

Wright, H. S. North Williston
Willard, D. S. North Hartland

Whitney, H. O. Essex Junction
Whitelaw, F. R. Randolph

Wheeler, W. H. South Pomfret
White, A. R. Burlington

Wallace, Sidney Waterbury
Walker, H. W. South Woodstock

Williams, J. B.,
Glastonbury, Conn.

Webb, J. T. New Braintree, Mass.
Weed, B. W. St. Albans

Whitman, C. D., Fishers Island,
New London, Conn.

Warner, B. F. East Burke
Wilson, James, Ex Sec'y Agr.,

Tama, Iowa
Winslow, Chas. L. Mt. Holly

Wright, Seaver D. White River Jct.

Note—Your Secretary would consider it a favor if the members would notify him of any changes or corrections in the above list.

ADDISON COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Elgin Springs Cry.	Elgin Springs Cry. Co.	Vergennes, R. D. 1.	Eugene Baudette	Vergennes, R. D. 1.
Donahue's Cry.	W. C. Donahue	Monkton	W. C. Donahue	Monkton
Green Mt. Cold Spgs. Cry.	Starksboro Coop. Cry. Co.	Starksboro	Henry Besette	Starksboro
Lake Dunmore Cry.	L. Dunmore Cry. Co.	Salisbury	Ray Fletcher	Salisbury
Lincoln Cry.	Lincoln Coop. Cry. Co.	Lincoln	F. C. Chapman	Lincoln
Orwell Cry.	Tait Bros.	Springfield, Mass.	C. L. Munger	Orwell
Reef Bridge Cry.	Reef Bridge Cry. Ass'n	Middlebury, R. D.	L. B. Whitman	Middlebury, R. D.
Vergennes Cry.	J. F. Donahue	Vergennes	J. F. Donahue	Vergennes
Middlebury Cry.	Coons Ice Cream Co.	Burlington	A. M. Hayward	Middlebury
Noyes' Cry.	K. E. Noyes	Salisbury	K. E. Noyes	Salisbury
Green Mt. Valley Cry.	B. L. Birdsall	Bristol, R. D.	B. L. Birdsall	Bristol, R. D.

Shipping Stations.

Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	H. C. Debuque	Ferrisburg
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	H. C. Buker	No. Ferrisburg
Maine Cry. Sta.	Maine Cry. Co.	Providence, R. I.	Roy Kingman	Ferrisburg
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	S. B. Bacon	Vergennes
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	C. A. Briggs	New Haven Jct.
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	Chas. Cunningham	Vergennes, R. D.
Middlebury Coop. Sta.	Addison County Dairy Co.	Middlebury	N. C. Nelson	Middlebury
Bronx Farm Sta.	Bronx Farm Co., Inc.	New York City	E. J. Williams	Salisbury
C. Brigham's Sta.	C. Brigham Co.	Cambridge, Mass.	A. J. Hayes	Leicester Jct.
C. Brigham's Sta.	C. Brigham Co.	Cambridge, Mass.	G. N. Blake	Bristol

Nichol's Ch. F'ct'y	A. M. Sherbino	Bridport	A. M. Sherbino	Bridport
West Bridport Ch. F'ct'y	W. Bridport Cheese Ass'n	Bridport	E. J. Woodbury	Bridport
Shoreham Ch. F'ct'y	Dickerson & Brown	Shoreham	C. E. Dickerson	Shoreham
Red Clover Ch. F'ct'y	Red Clover Cheese Ass'n	E. Shoreham	Oscar Poulin	Middlebury, R. D.

Cheese Factories.

BENNINGTON COUNTY.

Shipping Stations.

Castleton Dairy Co., Sta.
Schade's Milk Sta.
Hood's Sta.
Manchester Cry.

Castleton Dairy Co.
Wm. Schade
H. P. Hood & Son
Manchester Dairy Co.

New York City
Yonkers, New York
Charlestown, Mass.
Manchester

W. Rupert
Rupert
W. Rupert
Manchester

Dorset Ch. F'ct'y
No. Rupert Ch. F'ct'y

Dorset Cheese Ass'n
No. Rupert Cheese Co.

Dorset
Pawlet

C. L. Lee, Sec'y
Frank Root, Sec'y

Dorset
Pawlet

Cheese Factories.

CALEDONIA COUNTY.

Creameries.

Pine Hill Cry.
Mountain View Cry.
Lamolie Valley Cry.
Montgomery's Cry.
St. Johnsbury Cry.
Danville Cry.
Lyndonville Cry.
No. Danville Cry.
Barnet Cry.
McIndoes Cry.
El. Barnet Cry.
So. Peacham Cry.
So. Walden Cry.
Noyesville Cry.
Sheffield Cry.

Mrs. S. A. Buck
Mt. View Coop. Cry. Co.
Lam. Val. Coop. Cry. Ass'n
J. S. Montgomery
El. St. Johns. Coop. Cr. Co.
Danville Cry. Ass'n
Lyndonville Cry. Ass'n
N. Dan. Coop. Cry. Ass'n
Barnet Coop. Cry. Co.
McIndoes Cry. Co.
El. Barnet Cry. Co.
So. Peacham Cry. Co.
Holland Cry. Co.
F. A. Messer
Closed

Wheelock
W. Barnet
E. Hardwick
E. Hardwick
E. St. Johnsbury
Danville
Lyndonville
N. Danville
Barnet
McIndoes
Chas. Parker
D. F. McPhee
Springfield, Mass.
Montpeller

Mrs. S. A. Buck
J. Strawbridge
W. A. Vancor
J. S. Montgomery
B. C. Colburn
E. S. Morse
H. M. Dresser
O. V. Eley
Perley Ayers
R. M. Sanborn
Chas. Parker
D. F. McPhee
F. Miner
R. L. Lawson

Wheelock
W. Barnet
E. Hardwick
E. Hardwick
E. St. Johnsbury
Danville
Lyndonville
N. Danville
Barnet
McIndoes
E. Barnet
So. Walden
Noyesville

Passumpsic Sta.
Plymouth Cry.
Alden Bros. Cry.

Plymouth Cry. Co.
Plymouth Cry. Co.
Alden Bros.

Boston, Mass.
Boston, Mass.
Boston, Mass.

A. C. Granger
H. M. Goodwin
B. C. Wilson

Passumpsic
St. Johnsbury
Hardwick

Shipping Stations.

CHITTENDEN COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Jonesville Cry.	Borden Cond. Milk Co.	Richmond	C. C. Fuller	Jonesville
Lake Champlain Cry.	W. B. Johnson	Essex Jct.	A. D. Lavine	Essex Jct.
Westford Cry.	Westford Cry. Co.	Westford	H. E. Pierce	Westford
The Cooperative Cry.	The Coop. Cry. Co.	Underhill	Roy Montgomery	Underhill
Johnson Cry.	L. W. Johnson	Huntington	L. W. Johnson	Huntington
Donahue's Cry.	M. F. Donahue	Essex Jct.	M. F. Donahue	Essex Jct.
Burlington Coop. Cry.	Burl. Coop. M. Pro. Co. Inc.	Burlington	M. Atherton	Burlington
White's Cry.	White's Pure Milk Pro. Co.	Burlington	A. R. White	Burlington

Shipping Stations.

Colchester Cry.	Borden Cond. Milk Co.	Richmond	E. W. Fisher	Colchester
Brown's River Cry.	Borden Cond. Milk Co.	Richmond	John Hopkins	Essex
Shelburne Cry.	Shelburne Coop. Cry. Co.	Shelburne	W. H. Prindle	Shelburne
Richmond Cry.	Rich. Farms Coop. Cry. Co.	Richmond	M. J. Quinn	Richmond
Cloverdale Cry.	Bryant & Chapman Co.	Hartford, Conn.	W. H. Gomo	Cambridge
Whiting Sta.	D. Whiting & Son	Boston, Mass.	H. E. Mooney	Milton
Borden's Sta.	Borden's Cond. Milk Co.	Richmond	W. D. Agen	Underhill
Sheffield Farms Sta.	Sheffield Farms Co., Inc.	New York City	I. Booska	Charlotte
Lake View Cry.	Lake View Coop. Cry. Co.	Charlotte	P. R. Aunchman	Charlotte
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Ed. Shores	Milton
Oak Hill Sta.	Borden Cond. Milk Co.	Richmond	C. G. Austin	Williston
Hood's Sta.	H. P. Hood & Son	Charlestown, Mass.	Fred James	No. Williston
Borden's Sta.	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg
Borden's Condensary	Borden Cond. Milk Co.	Richmond	F. H. Shepardson	Richmond
Borden's Condensary	Borden Cond. Milk Co.	Richmond	P. E. Demick	Hinesburg

Condensaries.

ESSEX COUNTY.

Creameries.

Brighton Cry.	Simmons & Hammond	Portland, Maine	H. O. Humphrey	Island Pond
Trout Brook Cry.	A. M. Baker	Concord	J. R. Ralston	Concord

H. P. Hood & Son
H. P. Hood & Son

H. P. Hood	Charlestown, Mass.
H. P. Hood	Charlestown, Mass.

Shipping Stations.

Concord
E. Concord

FRANKLIN COUNTY.

Creameries.

Maple Leaf Cry.
Clover Leaf Cry.
Franklin Co. Cry.
Maple Hill Cry.
Missisquoi Valley Cry.

T. Trahan
C. O. Harvey
Franklin Co. Cry. Ass'n
Maple Hill Cry. Inc.
Maple Hill Cry. Inc.

Swanton
Fletcher
E. Berkshire
E. Berkshire
Richford

Swanton
Fletcher
E. Berkshire
E. Berkshire
Richford

E. Trahan
H. C. D. Smith
L. H. Button
D. A. Johnson
P. O. Noso

Shipping Stations.

Green's Corners Cry.
Wachusett
Fairfax Cry.
D. Whiting & Sons
Alden Bros.
Sheldon Cry.
Hood's Plant
Hood's Plant
Hood's Plant
Hood's Plant

H. P. Hood & Sons
E. H. Thayer
H. P. Hood & Sons
D. Whiting & Sons
Alden Bros.
Alden Bros.
Hood & Sons
Hood & Sons
Hood & Sons
Hood & Sons

Charlestown, Mass.
Enosburg Falls
Charlestown, Mass.
Boston, Mass.
Boston, Mass.
Boston, Mass.
Charlestown, Mass.
Charlestown, Mass.
Charlestown, Mass.
Charlestown, Mass.

H. E. McNamara
E. E. Derby
H. J. Connor
H. E. Mooney
F. E. Brady
M. D. Mack
Jim Berry
F. M. Adams
W. J. Jennings
A. E. Doney

Green's Corners
Enosburg Falls
Fairfax
St. Albans
E. Fairfield
Sheldon
Sheldon Jct.
E. Fairfield
Fairfield
Highgate Center

Condensaries.

Federal Packing Co.
Hood's Plant
Maple Hill Cry.

Enosburg Falls
Charlestown, Mass.
East Berkshire

O. L. King
C. Douglass
B. H. Combs

Enosburg Falls
St. Albans
E. Berkshire

GRAND ISLE COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
So. Hero Cry.	So. Hero Coop. Cry. Ass'n	So. Hero	Thos. Orne	So. Hero
Pearl Creamery	Grand Isle Coop. Cry. Co.	Grand Isle	Fred Chadwick	Grand Isle
Jordan Bay Cry.	R. H. Wilcox	Isle La Motte	F. A. Brown	Isle La Motte
Grand Isle County Cry.	G. I. Co. Coop. Cry. Ass'n	Shipping Stations.		
Boston Jersey Cry.	H. P. Hood & Sons	Grand Isle	F. A. Briggs	Grand Isle
		Charlestown, Mass.	S. C. Spaulding	Alburgh

LAMOILLE COUNTY.

Creameries.

Mt. Mansfield Coop. Cry.	Mt. Man. Coop. Cry. Ass'n	Stowe	R. M. Metcalf	Stowe
Gold Brook Coop. Cry.	G. Brook Coop. Cry. Ass'n	Shipping Stations.		
Stafford & Sons Cry.	Stafford & Sons	Morrisville	H. G. Fuller	Stowe, R. F. D.
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	A. B. Judd	Morrisville
C. Brigham Co.	C. Brigham Co.	Cambridge, Mass.	M. C. Washburn	Cambridge Jct.

ORANGE COUNTY.

Creameries.

Stafford Cry.	Stafford Cry. Co.	So. Stafford	W. P. Stone	So. Stafford
Green Mt. Cry.	Green Mt. Cry. Co.	West Topsham	W. E. Hood	West Topsham
Randolph Coop. Cry.	Randolph Coop. Cry. Co.	Randolph	A. E. Johnson	Randolph
Washington Cry.	Washington Cry. Ass'n	Washington	O. E. King	Washington
Farmers Coop. Cry. Co.	Farmers Coop. Cry. Co.	East Corinth	L. A. King	East Corinth
Topsham Coop. Cry.	Topsham Coop. Cry. Co.	Topsham	C. E. McLam	Topsham
Wells River Cry.	Wells River Cry. Ass'n	Wells River	H. L. Lyster	Wells River
Orange Co. Cry.	Orange Co. Cry. Ass'n	Chelsea	L. R. Brown	Chelsea
Williamstown Cry.	Lyndonville Cry. Ass'n	Lyndonville	A. H. Jewett	Williamstown
West Fairlee Cry.	Lyndonville Cry. Ass'n	Lyndonville	F. R. Haywood	West Fairlee
Tunbridge Coop. Cry.	Tun. Coop. Cry. Ass'n	Tunbridge	H. Whitney	Tunbridge
Vershire Creamery	Vershire Coop. Cry. Ass'n	Vershire	L. S. Flint	Vershire
Corinth Cry.	Lyndonville Cry. Ass'n	Lyndonville	F. D. Little	Corinth
Lake Morey Cry.	Lake Morey Cry. Co.	Fairlee	Wm. J. Phillips	Fairlee

C. Brigham Sta. Boston Jersey Cry. Newbury Cry. Hood's Milk Sta. Highland Cry.	C. Brigham Co. H. P. Hood & Son Lyndonville Cry. Ass'n H. P. Hood & Son Plymouth Cry. Co.	Shipping Stations. Cambridge, Mass. Charlestown, Mass. Lyndonville Charlestown, Mass. Boston, Mass.	J. J. Stimets J. B. Broadhead G. A. Doe E. F. Corliss J. W. Layten	Randolph No. Thetford Newbury Boltonville West Newbury
Bradford Cry.	Lyndonville Cry. Ass'n	Cheese Factories. Lyndonville	F. H. Bickford	Bradford
Hood's Randolph Sta.	H. P. Hood & Son	Condensaries. Charlestown, Mass.	L. F. Butman	Randolph
ORLEANS COUNTY.				
Orleans Cry. W. Charlestown Cry. Derby Line Cry. Lowell Cry. Missisquoi Valley Cry. Albany Cry. Clyde River Cry. Black River Cry. Jersey Star Cry. Meadow Brook Cry. Caspian Lake Cry. Norton Mills Cry.	J. G. Turnbull Co. J. G. Turnbull Co. J. G. Turnbull Co. Miss. Vall. Coop. Cry. Co. J. G. Turnbull Co. J. G. Turnbull Co. U. S. Bean Jersey Cry. Ass'n N. C. Stevens F. A. Messer H. P. Hood & Son J. G. Turnbull	Creameries. Orleans Orleans Orleans Orleans Orleans Orleans Lowell, Mass. Irassburg W. Glover Montpeller Charlestown, Mass. Orleans	W. A. Badger J. G. Eley D. E. Lamberton Clark Courser R. Brahana Geo. Fox R. H. Bishop H. J. Bover E. G. Ford U. B. Bates G. E. Morse J. R. Andrews	Orleans W. Charlestown Lowell So. Troy Albany E. Charlestown Craftsbury Irassburg Glover Greensboro No. Troy Norton
Newport Ctr. Cry. H. P. Hood & Sons Glover Cry. Derby Center Cry.	H. P. Hood & Sons H. P. Hood & Sons Lyndonville Cry. Ass'n H. P. Hood & Sons	Shipping Stations. Charlestown, Mass. Charlestown, Mass. Lyndonville Charlestown, Mass.	Chas. Hutchins R. S. French C. M. Lyon M. E. Day	Newport Center Barton Glover Derby Center
H. P. Hood & Sons	H. P. Hood & Sons	Condensaries. Charlestown, Mass.	H. L. Alexander	Orleans

RUTLAND COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Proctor Cry.	Vermont Marble Co.	Proctor	S. L. Harris	Proctor
Hortonville Cry.	Tait Bros.	Springfield, Mass.	F. L. Gidding	Orwell, R. D.
Otter Crook Cry.	Jones Bros.	Brandon, R. D.	E. W. Parent	Brandon, R. D.
Champlain Valley Cry.	Tait Bros.	Springfield, Mass.	F. E. Richter	Fair Haven

Shipping Stations.

C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	C. J. Wilbur	Wallingford
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	R. O. Bugbee	Wallingford
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	D. F. Andrews	Danby
C. Brigham Sta.	C. Brigham Co.	Cambridge, Mass.	A. W. Needham	So. Wallingford
Castleton Dairy Co. Sta.	C. Brigham Co.	Cambridge, Mass.	C. L. Graves	Danby
Castleton Dairy Co. Sta.	Castleton Dairy Co.	New York	C. E. Cuthbert	Castleton
Maple Hurst Cry.	Tait Bros.	New York	Henry Juckett	West Pawlet
Tait Bros. Sta.	J. Smith	Springfield, Mass.	J. A. Wells	Benson
Smith Cry.	Bordens Cond. Milk Co.	Springfield, Mass.	J. J. Jackson	Fair Haven
Bordens Sta.	Sheffield Farms Co. Inc.	New York City	W. J. Stebbins	Fair Haven
Sheffield Farms Sta.	Tait Bros.	New York	D. E. Decter	Poultney
Tait Bros. Swale Sta.	Tait Bros.	New York	J. J. Cunningham	Florence
West Rutland Cry.	C. W. Lamphere	Springfield, Mass.	W. T. Corey	Fair Haven
Alden Bros. Sta.	Alden Bros.	West Rutland	C. L. Lamphere	West Rutland
Smithtown Cheese Fct'y	Smithtown Cheese Co.	Boston, Mass.	P. O. Eddy	Brandon
Orange Co. Milk Sta.	Tait Bros.	West Rutland	E. S. Corlies	Rutland
Llanwhitkill Farm Cry.	Mrs. W. P. Cook	Springfield, Mass.	W. W. Smith	Brandon
Manchester Dairy Co.	Manchester Dairy Co.	Mt. Holly	H. D. Smith	Mt. Holly
Springfield Cry.	J. E. Redmond	E. Wallingford	A. B. Seward	E. Wallingford
Hood's Sta.	H. P. Hood & Sons	Springfield, Mass.	Walter Hill	Middletown Springs
		Charlestown, Mass.	Ed. Cramer	West Pawlet

Cheese Factories.

Cheese Factories.		
Gilt Edge Cheese F'ct'y	Gilt Edge Cheese Ass'n	Castleton
Maple Brook Cheese F'ct'y	A. N. Cook	Middletown Springs
Gleason Cheese F'ct'y	F. L. Russell	Cuttingsville
Union Cheese F'ct'y	Chas. Waters	Middletown Springs
West Pawlet Cheese F'ct'y	C. H. King	West Pawlet
Riverside Cheese F'ct'y	W. W. Jenks	West Rutland
Cold River Cheese F'ct'y	P. E. Plumley	No. Clarendon
Eureka Cheese F'ct'y	Floyd Pratt	Middletown Springs
Blakely Cheese F'ct'y	Frank Blakely	Pawlet
Mt. Holly Cheese F'ct'y	Geo. Woodbury	Cuttingsville
Crowley Cheese F'ct'y	A. W. Crowley	Belmont
Aldrich Cheese F'ct'y	W. E. Aldrich	Cuttingsville
E. Poultney Cheese F'ct'y	East Poultney Cheese Co.	East Poultney

WASHINGTON COUNTY.

Creameries.

Creameries.		
Montpelier Cry.	H. P. Hood & Sons	Charlestown, Mass.
Marshfield Coop. Cry.	Mars. Coop. Cry. Ass'n	Marshfield
Barre Cry. & C. Stor. Co.	Barre Cr. & Cold Stor. Co.	Barre
Winoski Valley Cry.	A. G. & G. F. Brailey	Fair Haven, Mass.
East Montpelier Cry.	E. Mont. Coop. Cry. Co.	East Montpelier
No. Montpelier Cry.	No. Mont. Coop. Cry. Ass'n	Northfield
Bryant's Cry.	A. E. Bryant	Northfield
East Calais Cry.	E. Calais Coop. Cry. Ass'n	East Calais
Cabot Cry.	F. A. Messer	Montpelier
So. Woodbury Cry.	So. Wood Coop. Cr. Ass'n	So. Woodbury
Warren Coop. Cry.	Warren Coop. Cry.	Warren
Mad River Valley Cry.	N. E. Belden	Waitsfield

Shipping Stations.

Shipping Stations.		
C. Iringham Sta.	C. Brigham Co.	Cambridge, Mass.
Borden's Sta.	Bordens Cond. M. Co.	New York
Moretown Cry. Sta.	Moretown Cry. Co.	Moretown
Middlesex Cr. Sta.	Moretown Cry. Co.	Moretown
Plainfield Cry. Sta.	Deerfoot Farm Co.	Boston, Mass.
No. Calais Cry. Sta.	J. S. Tabor	No. Calais
		F. B. Butler
		C. D. Oliver
		F. H. Sayer
		L. B. Palmer
		C. B. Story
		I. S. Tabor
		No. Calais
		Plainfield
		Middlesex
		Moretown
		Waterbury Center

H. Jillet	Montpelier
C. M. Lilly	Marshfield
	Barre
E. E. Grant	Waterbury
John Bond	East Montpelier
F. C. Hillis	No. Montpelier
A. E. Bryant	Northfield
Buy Bancroft	E. Calais
Guy Cancroft	Cabot
W. H. Watkins	So. Woodbury
H. N. Paquette	Warren
H. W. Belden	Waitsfield

Castleton	Middletown Springs
Cuttingsville	Cuttingsville
Middletown Springs	Middletown Springs
West Pawlet	West Pawlet
West Rutland	West Rutland, R. D.
No. Clarendon	Middletown Springs
Middletown Springs	Pawlet
Pawlet	Cuttingsville
Cuttingsville	Belmont
Belmont	Cuttingsville
Cuttingsville	East Poultney
East Poultney	

WINDHAM COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
North River Cry.	No. River Cry. Ass'n	Jacksonville	E. S. Murdock	Jacksonville
Deerfield Valley Cry.	Deerfield Valley Cry. Ass'n	Wilmington	F. A. Rist	Wilmington
Windham Country Cry.	Windham Co. Cry. Ass'n	Newfane	C. A. Nichols	Newfane
Wardsboro Cry.	Wardsboro Coop. Cry. Co.	Wardsboro	Miss H. Halonon	Wardsboro
Guilford Coop. Cry.	Guilford Coop. Cry. Ass'n	Brattleboro, R. D.	F. C. Bates	Brattleboro, R. D.
Holbrook's Cry.	R. I. Holbrook	Townshend	R. I. Holbrook	Townshend
West River Cry.	West River Cry. Co.	So. Londonderry	W. C. Hall	So. Londonderry

WINDSOR COUNTY.

Creameries.

Name of Plant.	Name of Operator.	Post Office Address.	Name of Maker or Manager.	Post Office Address.
Elm Valley Cry.	Belknap & Sons	Cavendish	D. H. Belknap	Cavendish
Hood's Cry.	H. P. Hood & Sons	Charlestown, Mass.	Geo. Sumner	Woodstock
Middle Valley Cry.	Myron J. Buck	East Bethel	R. H. Holland	E. Bethel
W. Riv. Valley Coop. Cry.	W. R. Val. Coop. Cry. Ass'n	Rochester	J. H. Mussey	Rochester
Maplehurst Cry.	J. H. Mussey	Stockbridge	D. S. Jackson	Stockbridge
Silver Lake Cry.	F. E. Allen	Barnard	F. C. Howe	Barnard
S. & F. Cry.	F. E. Fowler	So. Royalton, R. D.	E. F. Moore	So. Royalton, R. D.
Moore's Cry.	E. F. Moore	So. Royalton, R. D.	H. H. Densmore	So. Royalton, R. D.
Harrington Cry.	H. H. Densmore	Bethel	No. Pomfret	Bethel
Sherburne's Cry.	A. E. Sherburne	No. Pomfret	A. E. Sherburne	No. Pomfret
Sharon Coop. Cry.	Sharon Coop. Cry. Ass'n	Sharon	W. C. Porter	Sharon
West Hartford Cry.	A. L. Dow	West Hartford	A. L. Dow	West Hartford
Whiting Cry. Sta.	D. Whiting & Sons	Boston, Mass.	F. D. Jackson	Hartland F. Corners
Whiting Sta.	D. Whiting & Sons	Boston, Mass.	Geo. C. Gardner	Acutneyville
Hood's Sta.	H. P. Hood & Sons	Charlestown, Mass.	R. J. Patterson	Norwich
Child Bros. Cry. Sta.	Child Bros.	Waltham, Mass.	A. C. Cripps	Brownsville
Manchester Cr'm Co., Sta.	Manchester Cry. Co.	Windsor	J. A. McGuire	Windsor

Shipping Stations.

Cheese Factories.

Plymouth Cheese F'ct'y Nichles Hopsas Ch. F'ct'y	Plymouth Cheese Co. Nichles Hopsas	Plymouth So. Royalton, R. D.	E. C. Aldrich Nichles Hopsas	Plymouth So. Royalton, R. D.
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Where no other state is mentioned the address is Vermont.

Owing to war conditions a number of the creameries, shipping stations and cheese factories have been temporarily closed or combined with others into larger ones.

The condensaries are counted with the shipping stations because they often ship milk and cream. All those plants which have one or more large vacuum condensing pans are listed as condensaries.

Several of the creameries, ship milk and cream at odd times and several make some cheese. A number of the shipping stations also make butter and cheese. The cheese factories often make a little butter and ship milk and cream.

SIXTEENTH
ANNUAL REPORT
OF THE
Vermont State
Horticultural Society

PROCEEDINGS

OF THE

Twenty-second
Annual Meeting and Exhibition
held at St. Johnsbury, Vt.,
November 19-23
1918



St. Albans, Vt.
St. Albans Messenger Co. Print
1919

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**OFFICERS OF THE VERMONT STATE HORTICULTURAL
SOCIETY.**

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GEORGE D. AIKEN.....Putney

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Bennington County.....W. S. HINMAN, Bennington
Caledonia County.....E. H. HALLETT, St. Johnsbury Ctr.
Chittenden County.....A. M. VAUGHAN, Shelburne
Essex County.....C. W. KEEZER, P. O. Colebrook, N. H.
Franklin County.....H. K. BROOKS, Swanton
Grand Isle County.....T. B. LANDON, South Hero
Lamoille County.....GEO. TERRILL, Morrisville
Orange County.....GEORGE MEIGS, Randolph Ctr.
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Washington County.....H. J. CONANT, Montpelier
Windham County.....W. F. RANNEY, Westminster
Windsor County.....G. F. MARSH, Chester

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M. B. CUMMINGS.....Burlington .

TREASURER.

W. C. COLTON.....Montpelier

AUDITOR.

A. T. CLARK.....Vergennes /

EXECUTIVE COMMITTEE.

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M. B. CUMMINGS.....Burlington
E. S. BRIGHAM.....St. Albans
C. L. WITHERELL.....Middlebury
R. R. MCRAE.....Castleton

ADDRESS OF WELCOME.

**HON. JAMES COSGROVE, ST. JOHNSBURY, REPRESENTING THE
COMMERCIAL CLUB.**

*Mr. President, Officers and Members of the Vermont State
Horticultural Society:*

The privilege of extending a welcome to an organization of this kind is an entirely new one for me. I have had occasion, many times, to speak in this town hall, and I hope the occasions have not passed forever. I am sure that I voice the sentiments of the people of St. Johnsbury in extending to you a hearty welcome. I am not at all familiar with the scope of your organization or the work you are engaged in, except as I have seen it here this evening and learned from your program, but I know from my own experience this year in horticulture that there is a tremendous field for the work you are devoting yourselves to, and I am sure that the people of this community will show their appreciation by turning out in larger numbers for the education that must be gained from a meeting of this kind. I know that those members of the organization who have come, are here for a purpose. Therefore, in the name of the town of St. Johnsbury and on behalf of the Commercial Club of St. Johnsbury we bid you welcome and hope your deliberations will be satisfactory to yourselves and beneficial to the State of Vermont.

RESPONSE TO WELCOME.

PRESIDENT GEORGE D. AIKEN, PUTNEY.

Our purpose in coming here is to hold our annual fruit show and meeting, in this part of the state. The Horticultural Society works almost entirely with apples and vegetables. We are in the second "incarnation" of apple growing in Vermont. The first phase dealt with the farm orchards, which were planted years ago. I can remember fifteen or twenty years ago when those farm orchards were flourishing down in Windham County, when the buyers would go to each farm and buy up from twenty-five to 100 barrels from each of those farm orchards and load them at the cars. I remember one buyer in particular who came to our place and bought the apples for \$1.00 or \$1.50 a barrel. He would then go and help grade them and barrel them, because he was the only man around there that had a barrel header. When he came to the grading the old rule held, of one hole, No. 1 grade and two holes, No. 2's, was followed.

I was born in a critical time in the history of horticulture, because in the last few years I have seen those old farm orchards decline from 100 or so barrels a year down to three, and even those were no good.

The second "incarnation" in the history of apple growing in Vermont is well illustrated as follows: The other day I was in Brattleboro where I saw boxes of McIntosh and Wealthy apples from the Connecticut Valley Orchards Company in Westminster. They were selling boxes of 100 apples at \$5.00 a box, and I asked the merchants if they sold well, and they said they could not get enough of them. I always supposed that the leading stores in each town were the ones that handled raspberries, but I found those that were selling apples at \$5.00 were what we call the second grade stores. To raise that kind of apples required study in spraying and cultivating. In two or three days you will find out concretely why we are here. We have men who have had experience and made studies of "up-to-date" apple growing, packing and selling. They will tell us how to do all these things.

THE BLISTER RUST DISEASE OF CURRANTS AND PINES.**H. L. BAILEY, BRADFORD.**

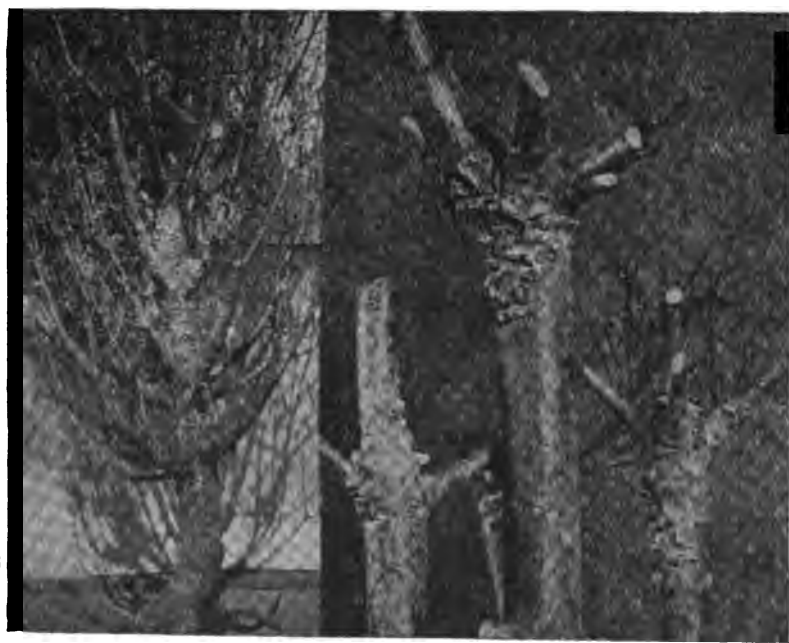
(Brief from an illustrated address.)

White pine blister rust is a fungus disease which lives upon the white pine and the currant and gooseberry plants. It is necessary for it to have both "hosts" in order to complete its life cycle. It cannot spread from pine to pine without the leaves of the currants or gooseberries acting as intermediaries. It kills the pines which it infects by cankering the bark. It does not seriously affect the ribes.

This disease was brought into the country from Germany upon infected pine nursery stock. The first known infection occurred at Kittery Point, Maine, about 20 years ago, but it was shortly afterward distributed with the imported pine throughout New England and New York. It has been found also in Pennsylvania, Michigan, Wisconsin and Minnesota. The most severe infection in plantations in Vermont have been at Woodstock and Lyndon. This year it has been found that native pine throughout the upper Connecticut River valley—the best pine region of the state—is generally infected, though it cannot be said how seriously the timber growth will be curtailed.

In the spring, the infected parts of pine reproduce by forming blisters upon the bark and there open, and millions of orange colored spores are scattered out. These are exceedingly light and may be carried many miles by the wind. Wherever they happen to come to rest on ribes leaves they originate a reddish colored rust upon the under sides. This rust develops a second stage upon the leaves after a short period and from this there are spores that are carried off by the wind, and probably by birds and insects, to the pine. The point of infection of the trees has recently been determined, as in the leaves or needles. It is believed generally that infection upon the bark will become visible within two or three years from the entrance of the spore into the leaf. Sometimes, however, this period of incubation may be as long as 18 years. A tree has never been known to recover when once infected.

The only known remedial measure is the removal of ribes from the vicinity of the pine. Generally speaking a third of a mile is considered ample distance because the spores which go from ribes to pine are much heavier than are those going from pine to ribes. This measure should not seriously interfere with the growing of cultivated cur-



Blister rust disease on currants and white pine. Above currants showing rust spots; photo from U. S. Department of Agriculture, Bureau of Plant Industry; below affected pine tree; photo from N. H. State Forestry Department.

rants in the state because the pine region is small, and comparatively few cultivated ribes are to be found within a third of a mile of commercial stands of pine. Wild prickly gooseberries and skunk currants constitute the most serious obstacle to the control of the disease. Experiments show, however, this wild ribes can be cleared from typical pine country for about \$2.00 per acre, with three inspections.

Thus far the greater part of the work directed against this disease in Vermont has been of an experimental nature. It was found, early in 1917, that extermination of the fungus or the complete stopping of its spread could not be expected. A demonstration control area was therefore established in the towns of Thetford and Fairlee for the purpose of experimenting and demonstrating control measures. The area was mapped and typed according to the nature of the growth. Records were kept both in 1917 and 1918 of the cost of the work of ribes eradication per acre according to type. The same procedure also has been carried out on and about the Downer State Forest Farm at Sharon. It is probable that a permanent policy of control may involve a plan of cooperative work between the State, the Federal Government and individual owners of pine land.

DISCUSSION.

Q. Does it attack the pitch pine? A. It attacks no pine, so far as is known, except those having five needles.

Q. Have you found this to any extent on the cultivated currant?

A. The black currant is usually pointed out as the malefactor in this situation. I have never paid a great deal of attention to the cultivated currants. I have seen it on red currants, and I think it will work on red currants, and where they are within a third of a mile of a stand where pine is being removed they ought to be removed. We are not advocating now any statewide removal, promiscuously, of these cultivated ribies.

MR. AIKEN:—I have seen it on black currants so that it covered the bushes, and on red currants six feet away where there would be no signs of it at all.

MR. BAILEY:—I have seen it on red currants and found it in places where we had not known of the blister being, Shrewsbury, for instance. You might find it on the wild gooseberry bush now and go half an hour from now and not find any more. I think it does spread and germinate on both black and red currants.

BOYS' AND GIRLS' CLUB WORK IN HORTICULTURE IN WAR TIMES.

E. L. INGALLS, STATE CLUB LEADER, U. V. M. BURLINGTON.

Club work is an organized system of extension teaching for young people, conducted by means of group meetings, home projects in agriculture and home economics and practical demonstrations in the field and home. It contemplates the organization of young people into groups called clubs, for the purpose of definite work under carefully prepared project programs with adequate local leadership.

Boys' and Girls' Club Work is a department of the Agricultural Extension Service of the University of Vermont and the United States Department of Agriculture, in co-operation. Its purpose is to awaken the interest of our boys and girls in farm and home activities, to induce them to assist the community and the nation by the production and conservation of our farm, field and home products; to train the hands and the mind by productive, supervised employment. It places emphasis on the best in agriculture and home making in the various communities where it is conducted.

Club Work is productive in that it demonstrates the best principles and practices in agriculture and home making.

Club Work means conservation and thrift in that these are definitely outlined as essential parts of the various projects.

Club Work is educational in the broadest sense of the term, in that it enables the boys and girls to put into actual practice on the farm and in the home the things which they have learned in school. It gives to the boys and girls a useful and practical education.

Club Work is useful because it teaches the boys and girls to do, and to learn the "whys", and "hows" and "whens" as well as to improve their practices and increase their remuneration. Club Work stands for efficiency and order, and is the best possible organization for systematic work in agriculture and home economics with boys and girls.

Club Work has a socializing influence in that it teaches team work and makes cheerful losers as well as winners. Club Work develops responsibility in the boys and girls

and we have been told that responsibility makes men and women.

Club Work recognizes the Great American Home as the basis for work with the boys and girls.

Club Work gives the boys and girls the opportunity to become acquainted with the problems that confront the community, the county and the country, and so gives them the privilege of helping to solve them.

Club Work stands for better and more efficient citizenship.

This work, then, is a part of the Farm Bureau work in each county, and is on a par with the county agent and home demonstration agent. Boys' and Girls' Club Work is not primarily a war work. It is organized on a permanent basis and simply adapts itself to war conditions.

The great war has speeded up Club Work in every detail—more funds, more field workers, more enrollments, more consistent follow-up, larger and better products, greater net profits, and saner use of same. In brief, Club Work, during the war, has had a splendid opportunity to put forward its production, conservation and thrift program. While it has not forgotten its essential interests in any particular, it has in these war times emphasized food production, conservation of food and clothing, and thrift in the use of products, and profits, and everything else.

Club Work keeps in view always,—first quantity and quality of output, second records and reports upon the cost of production and profits; third exhibit of best results and a written story of the entire project.

Club Work is a 4-H brand of education. The four H's represent the equal training of the head, hand, heart and health.

Train Head to

- (a) Think
- (b) Plan
- (c) Reason

Train Hands to

- (a) Be useful
- (b) Be helpful
- (c) Be skilful

Train Heart to

- (a) Be kind
- (b) Be true
- (c) Be sympathetic

Train Health to

- (a) Resist disease
- (b) Enjoy life
- (c) Make for efficiency

Many agencies are involved in Club Work, among which are the County Farm Bureau, Public School System, Commercial Organizations, the Grange, The Vermont State Banker's Association, Women's Clubs, Fair Associations, and others.

There have always been the most cordial relationships with the public schools of our State. At once, upon the organization of the Agricultural Extension Service, the State Board of Education placed its approval and granted the "open door" of the school house to Boys' and Girls' Club Work. Last spring, through the Commissioner of Education a definite cooperative plan was entered into, touching particularly enrollment, through the schools, a certain measure of follow-up and a summary of results of production. A quick reaction to the plan was the active participation in the work by seventy-five percent of the schools of the State, sixty-six district superintendents of schools, thirty teachers of Agriculture, twenty teachers of Home Economics, thirty-five principals, and one hundred and fifty rural teachers. Under this cooperation enrollment increased in a year from 5,000 to 24,000.

The State Bankers' Association has for three years approved Club Work, and through its Agricultural Committee has given liberal prizes to those whose records showed the best progress and best results.

Many Fair Associations have organized departments for boys and girls, that they might exhibit their best products, and in various ways these associations have encouraged honest striving for worth-while things.

There are twelve projects organized this year: garden, canning, pigs, poultry, potatoes, cooking, sewing, calf, lamb, corn, handicraft and maple sugar. 24,000 boys and girls are enrolled and are actively engaged in doing 38,000 different pieces of homework. Sixty Standard Clubs have been organized, 200 more are in the making. No less than \$200,000 worth of food products will have been produced this season by boys and girls enrolled in Club Work.

Referring once more to the different agencies, I should like to add to the list the Vermont State Horticultural Society. It was not in the list of names which I read, and it would seem to me, if I could make one application of the topic of this talk, that this organization might well consider the possibilities in Club work, and the connection that might be made between your organization and club work, and if other associations, like the State Grange, can function through club work, is there not an opportunity for this society to do likewise? Is there not a field that you can encourage boys and girls to enter? Your president has spoken of the fine service he has received from girls. Is there not a way that boys can be interested in the same way and be a help not only to us who employ them, but to the boys and girls who are thus employed?

CO-OPERATION IN HORTICULTURE.

PROF. B. R. BROWN, ORONO, MAINE.

Much has been said and more written, in recent years, on the subject of cooperation than any other single phase of horticulture. It has been held up to the public as the real remedy for most of the ills affecting agriculture. So much agitation has been given to the general subject of organization that everyone is familiar with the term. Many, however, fail to understand the fundamental principles involved and to fully appreciate the conditions necessary to its successful operation. It shall be my purpose, during the time allotted to me, to attempt to analyze the conditions under which successful cooperative organizations are now being operated, and then to see if they can be applied to other fruit growing sections.

DEFINITION.—It is first necessary to define the term cooperation as applied to horticulture and circumscribe its limitations. In a general way cooperation is the banding together of two or more persons interested in the production of fruit, for the pooling of their interests and the handling of the work as a single individual. It implies that the members shall agree to a common plan for building the business and then delegate the authority to some one else to put the plans into action.

Specifically, the phases of fruit growing covered by such organizations are; the growing of the fruit, the harvesting operations, preparing the fruit for market, selling, and the buying of supplies. A cooperative plan may be formulated to cover all or any part of the above. The majority now include all except the first, and are usually summed up under the popular term marketing. Lately many organizations are also including production, since high prices can only be maintained by having a good produce to sell.

KINDS OF COOPERATIVE ORGANIZATIONS.—These are generally divided into classes known as "Mutual" and "Incorporated." The former is much the older and by far the less successful. As the term implies it represents a mutual agreement among the growers to do business in a certain way. No very definite contracts can be drawn, binding the producers to certain plans, neither can legal redress be had to punish those who fail to abide by the mutual agreement. As a result most of such organizations survived only so long as it was to the interests of all concerned to do so.

In the second case where the organization is incorporated under the laws of the states, it is given legal recognition. In all such cases any grower who becomes a member obligates himself to fulfill all the requirements of the organization. No member has the privilege of withdrawing except at the close of the season and a good liberal fine is always provided for diverting any of the fruit thru other channels than those designated by the organization. This prevents any disturbance in the plans and holds the membership together regardless of outside influences.

ORGANIZATION.—From the standpoint of the organization itself, two important kinds are recognized. These are known as the Stock Companies and the Non-Profit Sharing organizations. Of these two the former is by far the older and represented the first striking success in the handling of fruit. They were organized on the same plan as any modern stock company and were conducted upon a dividend paying basis. To organize such a company it was necessary for the promoters to sell stock to the producers in order to finance the undertaking. Each member was expected to subscribe in proportion to his acreage in fruit. The value of the shares varied from one to ten dollars for each acre of fruit.

The non-profit sharing organizations are the ones which at the present time are the most popular and with a few exceptions have made the greatest success. These do not call for the subscription of stock by the growers, no dividends are declared and no money collected except just an amount sufficient to run the business. A flat tax is levied on each package sold, large enough to pay the running expense of the organization. This is usually 5 cents a box and 20 cents a barrel for apples. The larger the quantity handled the less the operating expense, hence the larger the organization the cheaper the business can be conducted.

In your state of Vermont where the annual crop amounts to a million and a half bushels it ought not to be difficult to form an organization to handle at least 10 per cent of the crop. Ten per cent would amount to 150,000 bushels or 50,000 barrels. A tax of 20 cents a barrel for selling this amount would create a fund of 10,000 dollars for handling the work. While 20 cents a barrel might not represent any great saving over the present method, but in addition it is well to consider the amount that might be saved in buying supplies in wholesale quantities and the increased price for the fruit by securing a standard pack that can be guaranteed.

MANAGEMENT OF EXCHANGES.—The controlling power of cooperative organizations is invested in a board of directors. This is a purely representative body and generally consists of one delegate from each local association. Every community in which an organization is perfected is called a local association and is complete in itself. When a number of such units combine a central organization is formed and then a single delegate from each unit constitutes the board of directors. The constitution and by-laws of the association prescribe the powers and duties of this board so each member knows at all times how much authority is invested in each delegate.

The board of directors ordinarily do not undertake to handle the details of the business, but instead hire a manager who devotes all his time to the work. This manager has his duties and powers prescribed and is responsible to the board of directors. He is generally a man trained in the business of handling fruit and not necessarily one of the members. In fact, it is preferable that the manager should be an outside man rather than a member of any of the local associations.

In Maine there is now in successful operation a cooperative association known as "The Maine Fruit Growers Exchange." The central office is located at Auburn and is now composed of 16 local associations. They will do this year approximately \$100,000.00 worth of business. In your own state a central office could be located where ever it would be the most convenient, possibly at Montpelier. The local associations could be tied in from any section where there is enough fruit to warrant the establishing of one. This would coordinate all the fruit growing sections, prevent them from becoming competitors of each other and place the fruit industry on a dependable basis.

If the other New England States should choose to follow suit, competition would then be confined to the states. Should Maine receive a better price for her apples than Vermont, it could only be attributed to the enterprise of the organization and not to any favorable locational or climatic conditions. An increase in price for the fruit of any one section would tend to stimulate the efforts of the producers in all other sections. This would raise the standard of production and in time would likely produce keen competition between the different states.

Should the above difficulty occur, it would then be a simple matter to combine the various states into a New England Exchange. The central office would then probably be moved to Boston and the controlling board of direct-

ors would then be composed of one delegate from each of the several states. This would tie in all of the fruit sections of the six New England states, the business would be handled thru the Boston office and the six state managers would drop out. The net results would be a better distribution of the fruit, a higher price to the producer, better standardized grades and a reduction of the cost of marketing.

In the smaller exchanges, the manager with some clerical help is generally able to handle all the work. He becomes familiar with the market conditions, knows what the prices should be and what other sections are likely to come into competition. He arranges for the harvesting and packing, gives instructions for the shipping, makes the collections and disburses the funds to the producers. He also looks after the purchasing of supplies for the members. Where the business grows beyond the capacity of one man to handle the work, sub-departments are created.

SUB-DEPARTMENTS.—There are generally designated under the following heads as:—Field Organization, Statistical, Traffic, Legal, Selling, Advertising, and Purchasing. These may be consolidated or separated as the amount of the business will warrant. In the California Fruit Exchange, where a business of twenty-five to thirty million dollars is handled annually, all the departments are represented by separate heads.

FIELD ORGANIZATION DEPARTMENT.—This branch is concerned primarily with production. It aims to assist the growers in all problems or difficulties that have to do with the growing of the fruit. The man in charge should be a technically trained horticulturist. He should be familiar with questions of pruning, spraying, fertilizing, etc. and have his service available for the members at any time. Bulletins and circulars covering special problems that may arise, are frequently prepared and distributed. This department frequently represents the organization before committees of the state or federal experiment stations in order that special attention may be directed towards the needs of the fruit industry. (See chart.)

STATISTICAL DEPARTMENT.—This department is primarily for the collection of information concerning the crop and the markets. It is necessary in handling the fruit to know three things; What there is to sell, where the markets are and what competition there will be. The statistical department collects this information. Questionnaires are sent to each member as early in the season as a

COOPERATION IN AGRICULTURE

OBJECTS

1. GROWING
2. HARVESTING
3. PREPARING FOR MARKET
4. SELLING
5. BUYING SUPPLIES

SUB DEPARTMENTS

1. FIELD ORGANIZATION
2. STATISTICAL
3. TRAFFIC
4. LEGAL
5. SELLING
6. ADVERTISING
7. PURCHASING

KINDS

1. MUTUAL
2. INCORPORATED

ORGANIZATION

1. STOCK COMPANIES
2. NON-PROFIT SHARING

MANAGEMENT

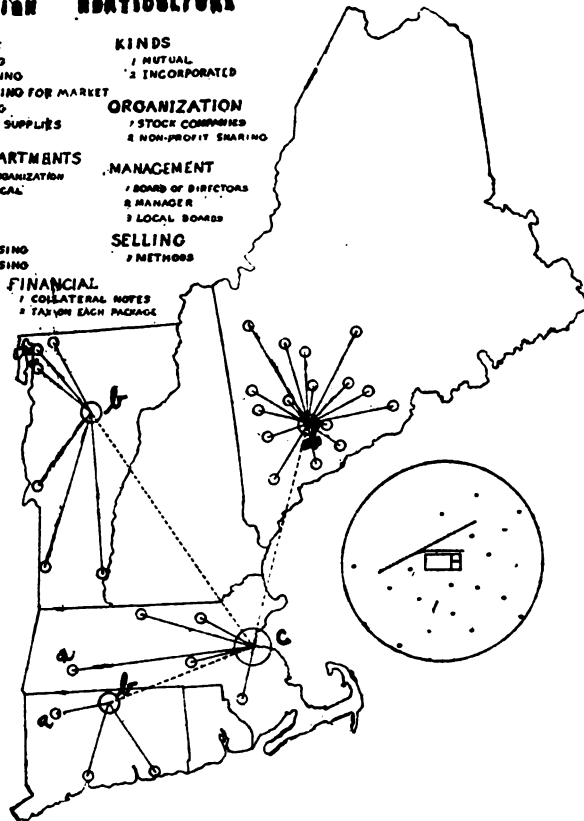
1. BOARD OF DIRECTORS
2. MANAGER
3. LOCAL BOARDS

SELLING

1. METHODS

FINANCIAL

1. COLLATERAL NOTES
2. TAXON EACH PACKAGE



PLAN OF CO-OPERATIVE FRUIT EXCHANGE FOR NEW ENGLAND STATES.

Legend for Chart.

- a-a-a—(Small circles.) Local associations as organized in each fruit section.
- b-b-b—The central office for the states through which the business of the local associations is handled.
- c— Proposed headquarters in the chief market center through which the combined products of the six states could be handled.
- d— Representing a local association within a convenient radius of a central packing house and shipping station. Maine now has 16 local associations combined in one central exchange, which does an average annual business of \$100,000.00.

safe prediction of the crop can be made. Some of the things that they want to know are; the number of trees in crop of the various varieties, an estimate of the total quantity of each variety, what percent of firsts, seconds or fancies, and an estimate of the packages or accessories needed to handle the fruit. This information should be in the hands of the manager from a month to six weeks before the actual harvesting of the fruit begins. It is then possible to determine how much fruit there will be to sell, the varieties and the percent of the various grades.

The information wanted from the markets is facts that have to do with the selling. What quantity of fruit can each city handle, what are the usual demands, what varieties and grades sell the best, what factors influence the price and what other fruits are likely to come into direct competition. These statistics are collected previous to the beginning of the marketing season. They are compiled into some easily accessible form and added to from year to year. While the marketing is in progress other kinds of information are collected, such as the daily arrivals, the selling price, reshipments, amounts placed in storage, etc. This material is collected each day by the agents that are located in the market, it is sent thru each night by wire and is in the manager's hands early in the morning. Where the organization covers considerable territory it is possible for the manager to have a complete review of all the markets for the previous day. With this information it is possible to divert cars or place them where there is the least congestion.

The information collected from competing sections has to do chiefly with production outside of the territory covered by the exchange. The amount of fruit from other sections is a fair indication of the price that the markets will stand. All this together with other similar information is collected by the statistical department and made available for any one in the organization.

TRAFFIC DEPARTMENT.—This department looks after the movements of the cars of fruit. It keeps records of the numbers, names and contents of the cars and follows them thru to their destination. In large organizations where twenty or thirty thousand cars a season are handled, the traffic department becomes a prime necessity. Where shipments cross the continent, it is necessary to know where each car is on each day of its journey. It frequently becomes necessary to divert cars before they reach their

destination and this can only be done by the information kept by the traffic department.

LEGAL DEPARTMENT.—This is purely concerned with the business of the law in connection with the management of the exchange. Legal claims against the organization are defended, claims against the transportation companies prosecuted, etc. New laws affecting the business are interpreted, hearings are attended before the states and interstate commerce commissions. In fact, it is the business of the legal department to safeguard the interests of every member of the organization.

SELLING DEPARTMENT.—The work of this department is to find a market for the fruit. It also has to see to the filling of the orders, the making of deliveries to the purchaser and the collecting of the bills. With the information secured by the statistical department, the salesmen know the varieties, grades and quantities that will be harvested. These are determined from four to six weeks before any fruit is ready to sell and this advance information becomes of immense importance in securing the best markets.

ADVERTISING DEPARTMENT.—This is a comparatively recent addition to the departments and is solely for the purpose of creating new markets and stimulating consumption. The work has already advanced far enough to prove that exchanges are justified in setting aside a certain amount of money for advertising purposes. The fundamental principles employed and the methods used are not materially different than used by large, state, or manufacturing concerns.

PURCHASING DEPARTMENT.—The buying of supplies is always an important adjunct to any fruit exchange. All purchases can be made in wholesale lots with a material reduction in first cost. Supplies may be contracted for a year ahead and held in the various warehouses until needed. The grower is relieved from the trouble of arranging for his materials and also of the necessity of tying up his money a long time in advance. In cases of necessity the exchange can advance the materials needed, carry them on account and deduct the cost from the sales of the fruit. Thus any member can be tided over a financial stringency without the necessity of straining his credit at the banks.

FINANCING THE EXCHANGES.—No organization can be run without funds. While a flat tax on each package is supposed to provide the revenues for carrying on the bus-

iness, considerable expense must be incurred before there is any fruit to sell, in order to get the organization in working order. These funds are usually provided by having each member issue a collateral note for a fixed sum for each acre he has in fruit. These are then accepted as security at the banks for the money needed. This is just sufficient to run the organization until the per-package tax is collected. If the tax is sufficient to pay expenses the collateral notes are returned at the close of the season. In actual practice it has been found advisable to make the tax large enough so that a small surplus will accumulate from year to year so the notes may be avoided.

HANDLING THE FRUIT.—Different exchanges use different methods in harvesting the fruit and preparing it for market. The best way is for each local association to have a central warehouse. As the fruit is removed from the trees it is placed in barrels or boxes and taken immediately to the warehouse. The foreman in charge stamps each package with the number of the member and makes out a receipt in triplicate for the fruit as it comes in. The original receipt goes to the member, one is forwarded to the central office and the third is kept in the warehouse.

Another method is to store the fruit in the packing house on the property of the members and then squads of packers are sent out to do the packing. This arrangement forces each member to supply his own packing house and to do a certain amount of the grading. A third method is for each member to do his own packing and then have each package inspected by an agent of the exchange. This is the chief method adopted in the handling of peaches, plums and most of the small fruits.

In no cases are the members allowed to assume full responsibility for the packing. It is only possible for the organization to secure a uniform pack and to guarantee results by having experts do the packing. And only guaranteed packs can be sold in advance of the season or without inspection.

Where the central packing house is used, the grading and packing is done shortly after the receipt of the fruit. The same packages are used that the fruit is brought in, and records are kept of each variety and the grades. The result of each day's pack is forwarded to the central office each night so that the manager may know at all times just what each warehouse contains and the varieties and grades that are available for shipping.

FILLING ORDERS.—When an order is received for a car load of fruit, it goes to the central office where the sales manager by referring to the records of the warehouses, can tell which one is in the best position to fill it. He then calls the foreman of the warehouse and instructs him to load out the car. When this is done the car is billed out direct to its destination and a copy of the shipping receipt goes to the central office. The sales manager then makes out the sales account and forwards it to the purchaser.

If the buyer happens to be in a place where there is an agent of the exchange, the sales account is mailed to the agent and he makes the collections direct. In case no agent is available and the rating of the purchaser is unknown a sight draft is attached to the sales account, which must be taken up before the railroads will deliver the fruit. This protects the exchange from bad accounts and tends to prevent unscrupulous dealers from getting into the business.

All money from the sales of fruit goes direct to the central office. Here the tax per package is deducted and the balance together with a copy of the sales sheet is forwarded direct to the members furnishing the fruit. It is not necessary to make a settlement with every shipment, but once a month or once every two weeks is sufficient and simplifies the book keeping. Where members have been extended credit for packages or other supplies this is deducted from the returns.

SELLING METHODS.—The actual selling of the fruit may be accomplished in a number of different ways. It will be remembered that an estimate of the quantity of fruit to be sold, together with the varieties and grades are in the hands of the sales force from four to six weeks before the fruit is harvested. With this information at hand the salesmen can call upon the trade and solicit orders in advance of the season.

The present tendency of the big exchanges is to do away with special salesmen and contract with exclusive agents in the different cities. This lessens the cost of selling and makes it possible for one firm to become the exclusive agent of a number of exchanges provided their products do not compete. Most of these agents work on a commission but some of them have a straight salary.

In a few cases separate organizations known as fruit distributors are formed and the fruit is then turned over to them to sell. To illustrate; a New England Fruit Distributors' Association might be formed with headquarters

in Boston, for the purpose of selling any and all kinds of fruit and vegetables. The exchange would then contract with this association to sell their fruit for a flat tax per package, which in most cases would be the same as if sold by the exchange. This is now becoming the popular method as it tends to prevent competition between the smaller exchanges and also avoids any conflicts with the Sherman Anti-Trust Law. In all such contracts the exchanges reserve the right to set prices if they so desire and not infrequently are members of the exchanges, as well as members of the distributors' association.

In conclusion, it only remains to determine whether any member may lose his individuality by pooling his fruit, or whether any locality might lose its identity by becoming an integral part of a much larger section. At the outset, it must be recognized that it requires more work to market fruit thru a cooperative association than it does by the individual. More records must be kept, more book-keeping done and far more attention given to business details. It is because of this extra attention to the business side of the work that the greater returns are realized and the aggregate cost of marketing lessened.

As for the individual, he rarely loses by pooling his interests, because of the standardization of the grades and packs. Where the work is properly supervised a No. 1 box of Baldwins would be worth the same, regardless of what part of the district the fruit was grown in. The only possibility then of a fluctuation in price would be due to the seasonal changes. This ordinarily would be less when handled by the exchange than if sold by the grower. It is also well to recognize that if the exchange is to set a higher standard for its fruit it will be forced to protect the growers who are not members of the organization. It is almost always necessary for the exchange to withhold sufficient quantities of fruit from the market to hold up the price while those who must sell early, and are not members, are disposing of their crop. When this surplus is gone, the exchange then begins to market its own fruit.

As for the identity of any section because of its superior fruit this is made secure by the use of the name of the local association on one end of the package and the big exchange on the other. It has frequently happened in the West that a small section of the country has made a national reputation on a single fruit and they naturally do not want to lose it. By using their own specific brand they not only maintain their identity but frequently gain

greater recognition thru the advertising given by the larger organization. This has been proven in actual practice to be the case.

BEANS AS AN INTERPLANT CROP IN ORCHARDS.

C. L. WITHERELL, MIDDLEBURY.

It has been demonstrated I believe quite thoroughly that the orchards of New England, especially the young plantings, require some form of cultivation in order to reach the maximum amount of wood growth as well as the production of fruit, however, the method our forefathers used of planting in turf is being practiced among some of our best orchardists with considerable success as far as wood growth is concerned, and if these growers are fortunate enough to establish a deep root system during the first few years, I have every reason to believe that the grass mulch system will serve well for the bearing trees later on.

Clovers and grain are used by many for intercropping among young trees. However, these crops are usually sowed in the early spring, the trees receive only a small amount of cultivation, during the driest part of the season they receive none, and all the time the intercrop is taking the moisture the trees need. In recent years the "seven, eight, and nine dollar bean" has become a very popular crop between the rows of trees, and when the trees are growing well and carrying a good green foliage, one may bank on a fair crop of beans providing they are not taken by a July frost, indicating that drainage, fertility and methods of cultivation are adapted to both.

Beans should not be planted until June in this locality, thus giving a good opportunity to work the soil early and often up to planting time, which serves at least four purposes; conserves the early spring moisture, kills a large percent of the weed seeds, helps to start a rapid tree growth and naturally makes an excellent seed bed, then with frequent cultivations up to the time the beans blossom the trees have had a fair chance of developing an excellent root system.

An illustration will bear me out on root system idea. An orchard set in sod some forty years ago which I renovated and plowed in 1911, had developed a mass of roots at the surface, so that it was impossible to plow shallow

enough to escape cutting them off in quantities. Realizing that the roots had been well trimmed this one plowing it was not plowed again, but intense harrowing for three or four years has produced a deeper root system and induced the trees to give annual crops. In plowing my young orchards which have been under cultivation since planting it is almost impossible to reach a root with a plow. It is impossible to till all orchards, and it would hardly be advisable for all of us to use our entire orchard area for beans, but a rotation of beans, grain and clover can be worked out to advantage in most orchards, thus keeping the soil worked a good portion of the time.

If a commercial orchardist were to raise beans as an interplant crop with the idea of developing tree growth as well as a money crop, I believe one of the important factors, is to equip himself with modern bean machinery.

The two row planter is adjustable for planting from twenty-six up to forty-two inches. These planters are equipped with fertilizer attachments which are very essential, and the impression that beans will produce a crop on poor or average soil is wrong, as we have proven that they respond to a liberal application of acid phosphate as readily as any other crop. We plant at a distance of twenty-eight inches, drilling the beans, and dropping the phosphate in advance, so that it does not come in direct contact with the seed. Beans sprout and push through the soil very quickly if planted shallow and the soil left loose. A heavy rain, on clay soil will sometimes pack the earth enough to retard germination, thus showing that the land should not be packed in any way.

Our trees are planted in thirty, thirty-six, and forty foot rows with twice that number of trees in the row. This permits of twelve, fourteen, or sixteen rows of beans between the rows of trees up to the third year. Then on account of the extended tree growth we narrow the planting area, thus giving more room to cultivate the trees without possibility of damage. It is our practice to keep the rows of trees clear of weeds, and one sure way of accomplishing this, is to plant beans in the tree row with a hand planter, and to insure a crop they must receive good care, which will usually pay a good profit for labor expended both in yield of beans, and in tree development. The first beans we ever raised were planted in rows of trees only, in a block of about six hundred fruit plants, we cultivated each side of the row, leaving grass and grain in the balance of the area. We harvested ten bushel of very fine red kid-

neys which sold for three dollars per bushel, which paid a fair profit, and required almost no extra time.

This success prompted us to extend our plantings, and the past season, 1918, we had thirty-seven acres.

The principal varieties used in the east are the red kidneys, yellow eyes, medium and pea beans. We have raised the red kidneys exclusive up to this last season when we made plantings of the first three varieties named, we find each variety has its short comings. The kidney is a larger bean, and requires more seed per acre, from four to five pecks being the right seeding; while the smaller varieties will produce a maximum crop with less seed.

We have proved to our entire satisfaction that the medium and yellow eyes are not adapted to our conditions, as on good soil they produce a rampant growth, which is hard to cut with a harvester. Then too in being quick growing varieties their harvesting season conflicts with apple picking.

It is very necessary to start the cultivators early, and work them until the beans are in blossom. We have tried two or three "riding cultivators" but have concluded that the one horse "walking cultivator" does the most effective work. We use a fourteen tooth spike cultivator for the first time through, for the reason that it does not throw dirt on the young beans: then we follow up with a seven tooth wide blade weed cutter, as we have named it, which runs shallow, yet hills the beans slightly, enabling the harvester to run more shallowly, as the soil softens the stalks and they are more easily cut.

The two row harvester works especially well in kidney beans as they grow in an upright manner with a very strong stalk, thus enabling the knives to cut clean, while the forks will draw the two together, leaving the plants light in the row and ready to cure.

Under average conditions this machine will harvest from six to eight acres per day, which some of us know is better than hand pulling. By cutting the beans we leave a good portion of the roots in the ground, and since beans are a legume their roots add considerable nitrogen to the soil.

In our experience beans are never in better condition to thresh than when dry enough and ready to draw in, but the weather conditions at harvesting time, the past two seasons, have been very unfavorable for threshing in the field, hence the need of barn room for storage.

While it is necessary with many threshers to run the pods through twice, we have one that does perfect work

with one feeding and which will thresh fifty bushels per day. This machine requires a two and one-half horsepower engine to operate it. Although the beans are very well milled we find it very advantageous to run them through a fanning mill which makes them ready for the picking machine, which will pick a bushel an hour of the average beans. This results in a product which will insure the highest market price. There are some buyers who prefer beans as they come from the thresher; but with a small acreage one can "make well" to hand pick them.

The season of 1917 proved to be a poor bean year. The early frosts in September together with excessive rains at harvest time, ruined entire plantings of some of the white varieties. We had fifteen acres of red kidneys in the wind-row which were subjected to three and one-half inches of rain. We had the pleasure of pulling them out of the mud, and were surprised to find that they were unharmed. These beans gave us a yield of about fifteen bushels per acre, which sold from \$13.00 to \$14.20 per 100 pounds on the commission market.

The weather conditions of last year prompted us to put this year's crop into the barn as fast as we could cure it, and as the beans are not threshed I am unable to give any figures on the yield of 1918.

THE NECESSITY OF BEES IN FRUIT PRODUCTION.

R. H. HOLMES, SHOREHAM.

The early feeling of antagonism has disappeared between fruit growers and beekeepers.

Experiments have proved that spraying can be done; and for the best results should be done, when there is little danger of the bees, namely, before and after blossoming.

No argument is needed to prove that the cross pollination of fruit blossoms is beneficial and necessary for best results in commercial orcharding.

We need further light in regard to the kinds of fruit that should be planted together in order that pollination may be more effectively carried on. Some fruit blossoms are wholly and others partially self sterile. Among the apples the R. I. Greening, King, Wealthy and others are dependent on other varieties for fertilization.

Of 87 varieties of apples tested at the Oregon Experiment Station, 59 were found self sterile; only 15 were found self fertile, and the remaining 13 partially self sterile.

Large orchards of cherries have been planted and having arrived at the bearing stage have proved unsatisfactory for the reason that self-sterile varieties have been planted which were immune to fertilization from their own blossoms but were also immune to fertilization to other self sterile varieties. Napoleon, Lambert and Bing planted together or separately yield little fruit but may be effectively pollinated with Black-Republican, Tartarian and Waterhouse.

The same principle is true with regard to the plum and several of the smaller fruits.

The successful pollination of blossoms is dependent slightly upon the wind but experiments have proven that only in a small degree. The pollination work is carried on by insects and if the weather is such that they cannot fly readily this sometimes proves a failure. Among the insects the honey bee holds the most important place, and it goes without saying that the more bees the more thorough the fertilization. I think in some cases where the beneficial results from bees has not met the expectation of the orchardist it was because there were too few bees kept to made their work noticeable. The experience of many orchardists has proven that they are a necessary adjunct to fruit growing.

Dr. Phillips of the Federal Bureau of Entomology says that beekeeping adds indirectly more to the resources of the country annually by flower pollination than by the sale of honey and wax. Several enthusiastic horticulturists have even declared that for all practical purposes in pollination the honey bee is alone sufficient, but this assertion must be modified for in the country as a whole hive bees are aided by wasps, wild bees and some other insects. Quoting from A. I. Root's A. B. C. of Bee Culture it is said—"While it is true that wild bees pollinated the wild flower, it is nevertheless true that the highly developed and cultivated fruits of modern times require the special agency of the honey bee". When a modern Burbank, for example, develops a new fruit by special hand pollination, and when those fruits are grown by the ton and carload, wild insects are wholly inadequate. The only pollinating insects under the control of man are the honey bees, and they have to be introduced in large numbers in order to make the growing of these fruits possible commercially. In sections where immense orchards cover many square miles of territory,

the wild insects are wholly inadequate to pollinate the great expanse of bloom and many apiaries must be established to obtain the best results. Fruit growing has a great future before it and must ever be associated with bee culture.

A few examples of prominent fruit growers may now be cited: One of the firm of Repp Bros. of Gloucester, N. J. owners of an 800 acre fruit farm, says, "I could not do without bees. I never take a pound of their honey. All I want them to do is to pollinate the blossoms. I'd as soon think of managing this orchard without a single spray-pump as to be without bees. I've got 50 colonies now and am building up the apiary each year."

Within 10 miles of the orchard just referred to is a 50 acre apple orchard that had been neglected to the degree that it had not been sprayed or pruned. Mr. Van Renssalaer, the tenant sprayed and pruned the trees, and put some bees on the place. The first year 16,000 bushels of perfect apples were secured and every year since that, from 10,000 to 15,000 have been harvested. Previous to this the orchard had produced hardly 500 bushels. This man says with enthusiasm, that the bees play a very important part in securing these results.

The editors of the various fruit-journals have published strong editorials favoring the placement of bees in orchards. An editor of the Rural New-Yorker made this statement: "I have seen the certain results of the good work of the honey bee in a neighbor's orchard. Those bees break the trees down just as truly as though they climbed on the trees by the million and pulled on them. The appearance of those trees after a few years of beekeeping would have convinced any fair minded man that our little buzzing friends are true partners of the fruit-grower."

Take this illustration of the effect of bees in a cherry orchard. Mr. E. Whitcomb of Nebraska reports how the bees helped secure a cherry crop in the year 1915. In writing for the Independent Farmer he says: "We had 300 bearing cherry trees close to our apiary. During the blooming season there were two days during which our bees worked on these cherry blossoms profusely. As a result we harvested 300 bushels of cherries when our neighbors two or three miles away, who had no bees, and yet whose trees bloomed as profusely as did ours, were compelled to come to our orchard for cherries."

The manufacturing of chemicals for spraying almost universally advocate spraying before the blossoms open and after the petals fall. The recommendations of our noted

experiment stations also are against spraying when fruit trees are in bloom.

In conclusion may we say that a proper understanding of these things removes any and every cause for antagonism between the Bee-keeper and the Horticulturist and each may consider the other as his ally and colleague.

ONIONS AS A MONEY CROP IN WAR AND PEACE TIMES:

J. J. DANSRO, NO. CLARENDON.

Onions are one of the oldest vegetables cultivated. Although the onion dates back as far as history, the greatest improvements have been made within the last two decades.

VARIETIES.—In varieties there is a long list, in color, size, and shape one can get what he may wish. In selecting your variety you must first ascertain the market preference. To be sure you can sell any one variety that is in demand in the market. If you like to grow a red onion and your market demands a yellow or white one you will find it difficult to get your red ones on that market.

The flat varieties are best adapted to muck and other heavy soils, while the globe shaped onions do best on lighter soils. I have found American Prize Taker the most profitable. Its fine appearance makes it a good seller, always commanding the top price. It is a good keeper.

SOILS.—The onion is adapted to most all our soils,—fertility being the main factor. There is no fertilizer to equal well rotted stable manure for the onion. There are no set rules as to the amount to be used per acre. On soils that are in good tilth twenty tons per acre will give good results. In culture, onion fields should be about level. Level land will prevent much washing away of the seeds, and will permit the use of wheel hoes. Avoid clay soils as they crust over and bake.

SEEDS.—The heavy losses frequently caused by poor seeds could be avoided if the grower will only test his seeds before planting them. Onion seed should be new. It is hard to get good onion seed, but at the same time you must remember that nothing but new seed is fit to use for an onion crop. Under present conditions I advise all to grow

their own seeds. I am sure that many of you would be more than pleased with the results.

SOWING.—The usual method of growing the onion is from seed, but many use sets and seedlings. Sowing the seed directly in the field is the more popular way. Early seeding is most important. The earliest seeding as a rule will make the heaviest crop. The distances of planting vary to suit the grower, but twelve to fourteen inches is the rule. When wheel hoes can be used, that is the most satisfactory method of cultivation. Onion seed should not be covered over a half inch, with the rows twelve inches apart. Five pounds should give a good stand.

Seedlings are much in use by some growers. Increased yields of fifty to one hundred percentage are claimed for this method. The Prize Taker is the variety most in use for transplanting. The transplanted onions will ripen three to four weeks ahead of those grown from seed. The extra labor involved in transplanting the seedlings is offset by the saving of one weeding.

The seedlings should have some six weeks' growth before going to the fields. When the seedlings should be pulled and the tops and roots cut back at least one half, before setting in the field. And after all are set out, cultivation should begin.

A stitch in time saves nine. With onions I say it saves a thousand. An onion field should be gone over twice a week, which would insure the destruction of weeds and a well cultivated field.

HARVESTING.—As soon as most of the tops are dead all should be pulled. If you wait for all to ripen the first ones to ripen will have made new roots, and such onions will not keep well.

STORING.—Onions should not be put into permanent storage until thoroughly dry and all immature ones are removed. To get a nice bright yellow appearance to your onions they should be removed as quickly as possible from the field, the less sun or rain they get after pulling the nicer and better onion you will get. Put them in a dark well ventilated room. Then you will have the nicest colored onions you ever saw.

The best container for onions is the bushel crate. They are handy to take in and out of the storage. The next best way is slated shelves. They should be built in sections ten or twelve feet long. Each shelf being set twelve inches above the other up to the desired height. Starting with the

bottom one you lay your shelf and the blocking for the next one before filling the first one with onions, and so on to the top. The temperature of the storage room should be kept low, two or three degrees above the freezing point is best. Avoid moisture in onion storage.

Of insects the maggot is the only one that troubles our onions here in Vermont. To prevent damage by the onion maggot we must destroy the fly that lays the eggs. The most effective way to poison it is by a tempting bait which must be given them along with the poison. I like the following prescription.

Take onion tops and boil them in one gallon of water and while cooling put in a pint of molasses, then one ounce of sodium arsenate and mix thoroughly. Then take a whisk broom and spray the plants. The point is to distribute it in fairly large drops about the field where the flies will get it. A spray is too fine for good results.

When onions smut and mildew, it is best to take another area, and let the pests die out.

MEETING THE PROBLEM IN CABBAGE CULTURE.

J. J. DANSRO, NO. CLARENDON.

First as to varieties. For a very early crop the early Jersey Wakefield is the best, but I find that it pays to be a little later with our cabbage and plant a cabbage that will give a bumper crop. The Copenhagen cabbage is very early and not more than a week later than the early Jersey Wakefield, and it is a cabbage that will easily yield double the number of pounds to the acre. With the world crying for food, I ask you all to discard all early cabbage. Eight tons per acre is an extra big yield for the early Jersey Wakefield. But this year I grew twenty tons of the Copenhagen Market cabbage on a half acre. Which would you prefer a crop of eight tons or a crop of forty tons? Our country needs the food. What is your answer? Copenhagen Market Cabbage!

With regard to late varieties the flat Dutch and drum-head varieties are very good cabbages but there is no call for them. Of late the Danish have come to the front, of which the ball heads are the best keepers. The Danish Ball Head cabbages will do well on most soils, but on very

sandy or on decided lime stone soil they will not do very well. On such soil I would recommend the Volga or Succession varieties.

Here in Vermont early cabbages must be grown under glass. I will here describe my method. I sow my seeds from March 20th to April 1st, using flats for the seedlings, putting two inches of sandy soil in the flats. I use soil of rather low fertility for seedlings. Too rich a soil should be avoided until they are set into the field.

Sowing the seeds in flats has proven the most satisfactory method of handling the early crop. For you can move them from a warm room or into a warmer one to push them along. It is a fact that it takes more water in flats, also you control the amount of water at will, which cannot be done when plants are sown in a solid bed.

The earlier you can get cabbage out into the field the earlier you will be able to cut them. Flat grown plants can be hardened at the will of the operator and are there ready for the field at the will of the gardener.

The main crop is grown with the least work, also with the smaller returns. Seed for the late crop is best sown in beds, making the one bed large enough to grow what plants you will want to plant in your fields. The seed bed should be worked into a fine condition. It is best to rake it over with hand rakes, then the seed is drilled in with rows one foot apart, then when the plants are up, they can be worked with a wheel hoe. They should be ready for the field in four weeks.

Pay me and I will pay you, can well be applied to the preparation of a field for cabbages. I do not believe that there are any other vegetables that will respond to high fertility like the cabbage. As a fertilizer for cabbages I prefer barn yard manure. The amount to be applied will depend on the amount of labor you are willing to give. The more manure and work you will put into the soil the better will be your returns.

In transplanting, a moist freshly prepared soil with cloudy weather are the ideal conditions for transplanting cabbage. Under such conditions less care is required in handling the plants. With dry weather and a hot sun, the plants should be pulled with some soil attached to the roots. I have had the best of results in transplanting by using the Master transplanter, a hand machine that will apply water or liquid fertilizer at the same operation.

Cultivation should begin as soon as the cabbage plants will have recovered strength enough to partly stand up-

right, and should be continued until the plants almost cover the ground. Cultivation twice a week is about proper.

In storage no one plan or system has or can give full satisfaction. Any place that will keep out the frost can be used to store cabbage. The essential points are moisture and ventilation. You must have moisture enough to prevent drying up and on the other hand enough ventilation must be provided to carry off all excess moisture, for if there is enough moisture so that water will collect on to the walls or cabbage you must ventilate or you will loose your crop.

Club root and black rot are serious diseases. Club root is the greatest enemy of the cabbage. A submarine that robs you of your cold cash. Rotations from three to five years must be practised in growing cabbage. On light sandy soils three years is well enough, while on some low heavy soils six years might be required to get it out. However, be sure that your land is free of the disease. None of the allied plants must be grown prior to the cabbage. Cauliflower, Kale, Turnips, Radish, Kohl Rabi, Mustard must be kept off your fields if you wish to be free of club root.

Black rot is a disease that causes heavy damage in some fields but I find that it does not do much harm in well fertilized soils. I will relate one experience that I had with it. Some five years ago after I had planted all that I had figured to, I decided to set out some more, having many extra plants on hand, so I prepared some more land just along side of my others, the land being pretty well fit as to tillage for some time, but not up in fertility for a good cabbage crop. I put in just six rows right along the side of my others, plants from the same bed and seed. In those six rows the black rot made almost a clean sweep, not over twenty per cent were left, at harvest time, while in the main lot not over two per cent showed black rot.

SEASONAL WORK ON A BERRY FARM—WHAT—WHEN—AND HOW.

PRESIDENT GEORGE D. AIKEN, PUTNEY.

The topic, "Seasonal Work on a Berry Farm—What—When—and How", is a wholesale order, because it would take quite a while to go through it very thoroughly. I can tell you what and when, and if you do not know how, and want to know how, ask and I will tell.

We will begin with the spring as soon as the snow goes, without waiting for the frost to get out of the ground. Currants, gooseberries, and sometimes raspberries and blackberries will get "studded in" the summer before, in spite of all you can do, and the easiest way to get rid of that, if it is not too heavy, is to begin in the spring just as the snow goes off. Each day the sun will warm up about two inches of the soil, and you can hoe that off without waiting for the ground to thaw.

As soon as the snow goes we can do our pruning, and with currants and gooseberries we leave as much new wood as possible because this season's growth will bear the best currants and gooseberries next year. The ideal currant and gooseberry bushes will not bear before three years of age. Cut off the broken branches, and if there happens to be any cane blight, cut that out; also, any canes affected by borers. You will find some cane blight on currants, although it is not common in Vermont.

The pruning of raspberries and blackberries can be done before the frost is out of the ground. You can usually tell, after you get used to it, whether a raspberry or blackberry cane is winter injured, and if so how far back it is injured. The wood will be shrivelled and dead. If you take your finger nail and bruise the bark, and it is a good bright color under there, you probably will know it is not winter injured. If they are injured early in the winter they will shrivel so you can tell it by spring. Blackberries generally winter kill, except the Snyder and Eldorado. The Herbert live through the winter in good shape in Waterbury. Cut back those canes below the point of winter injury. Some varieties, that are very rank growing, we can cut back to the desired height to make picking easy, and also cut them back in the spring.

In pruning blackberries some authorities recommend cutting back the side shoots. If you are not exactly sure

you had better leave those side shoots alone, because some varieties of blackberries bear their crops at the terminals of those side shoots, and if you cut back those lateral branches you will cut off your crop. In the Eldorado and Snyder it is better to leave the terminals alone.

After the frost is out of the ground we will have to set the posts and wires for grapes, and prune them, and I think it is well to let the young vines lie on the ground in the winter. I have not had a great deal of experience with grapes, but I think it is an advantage to leave them on the ground and let them be covered with snow.

The mildew is the most serious disease of the gooseberries. Spray before the buds start in the spring, with lime-sulphur solution 1-10, and before the blossoms open with a solution of 1-20, and after the blossoms fall with a 1-30 solution. This will not injure the leaves but will control the mildew the first year.

Then we will have to rake the mulch off the strawberries. I think that mulching strawberries is similar to taking out fire insurance. You may go four or five years and get through all right, but that fifth year, if you didn't get the snow, you would wish you had put your mulch on, for the frost will heave your plants. If you wait until they get some ice on in the fall and then mulch, you could leave that on in the spring until the ice is melted and then have berries two weeks later than the main crop.

It is best to start the cultivator as soon as you can in the spring and keep it up. I have found that the fertilizing of a berry field is less important than the cultivating. I have had raspberry fields that I have given all kinds of fertilizer, and apparently it was not anywhere near as important as the cultivating of those fields; and if you keep your fields cultivated you can keep them longer.

As soon as possible after the ground thaws out we will set the new fields. I believe that it is best to set red raspberries, currants and gooseberries in the fall, but strawberries, black and purple raspberries and blackberries, in the spring.

Before we get the spring work done we will have to begin picking Progressive strawberries. We began picking our Progressive strawberries the 24th of May this year, ten days before the Senator Dunlap were ripe. In setting new fields of berries we intercrop for the first year. The plants are set in April and we keep the ground cultivated as much as we can and keep it mellow all through the summer, but in between we put in our intercrop of shell or

string beans, or corn and cabbage. If you put in corn, put in something like Peep'o'Day or Golden Bantam that will not shade the plants too much, as would be the case in using Country Gentleman. I have had the best success with cabbage, setting the plants 3x6 feet, putting a cabbage in between each two plants in the row with an entire row between every two rows of berries, say 7000 plants to the acre, which this year would pay for planting and taking care of the field of berries several times over.

Now I will come to the most interesting part of the berry growing, which is the picking, packing and selling. Before you get your picking started you have to get your pickers. This year is the first year that we have had a surplus of pickers. We had to go quite a ways after them, and we had a surplus because so many of them wanted to get money for war savings stamps. I have found that girls are the best, although occasionally you get a boy that likes to pick and will make a business of it, and do the best he can to beat the girls. As a rule you will find ten girls to one boy interested in horticulture. We pay by the quart and we have them pick in pint baskets. We have two ways of getting three kinds of pickers: First, those that come and stay and board themselves, which we used to board for 40c a day. Second, those that pick by the basket. I paid four cents a quart for raspberries this year, and two cents for strawberries: Then we have the local help. A lot of women will come in and pick because they like to, and most of them will do good work. Our pickers range in age from nine to sixty-nine. Some of the older women will come. For our extra help we have to go to some town.

A method of picking raspberries, which can be applied to any other berries, is this: We have a stake at the end of each row with the number of that row on it, and the field boss will assign the pickers to each row of raspberries, one on each side. We put two pickers on each row for the reason that one picker cannot reach through and pick them all, and a picker will go up one side and get mighty good picking, and the other side will be poor, but with two pickers they get them all.

We give our pickers six-pint carriers or the four-quart strawberry basket carriers; but only one at a time, because if they have more, and get one full they will set it down in the shade and will be in the sun before long and the berries will get scalded before the carriers get them. When they get the first three quarts picked they have to come in to the man doing the checking and he will punch their cards. The cards begin at number 1 and run up to 144. If they

pick three quarts they punch three, or if six, they punch six, so that the highest number punched represents the total.

For the last three years all blackberries have been put in "pints" because the demand has been for this size basket. We put currants, gooseberries and strawberries into "quarts". We still use the oblong pint because it fits the standard 60-pint crate. We do not try to grade the berries at all. All good, sound berries are put in the crates for market. If they have some soft berries we send them to the canning kitchen for jam. If you are canning raspberries for sauce it is best to use the very best ones, and no broken ones. Put those broken ones into jam.

We get our berries off to market just as soon as we can after they are picked. The forenoon's picking will go out in the afternoon. The dealers know they are coming and have their orders ready for delivery of these berries by four or five o'clock in the afternoon. If they do not sell them that night they will keep over until the next morning. That afternoon's picking we use for our mail order trade. We have quite a mail order trade in the Massachusetts cities, although we have never tried to work it up, but they simply send to us. We use the afternoon's picking for that because if we sent the morning's picking they wouldn't get it until the next morning, but the afternoon's picking is put on the train about six o'clock at night and they get into Boston the next morning.

After the fruiting season is over we cut out the fruiting canes of raspberries and blackberries as close to the ground as we can. We can do it any time in the fall, but we have the most time during the last of August.

I believe that it is best, unless your ground is extremely rich, to keep your fields cultivated till fall, and if there are weeds that you can get out, keep them cultivated and hoed until you get them out.

The most satisfactory mulch for strawberries is buckwheat straw that has been threshed with a machine. If you thresh it by hand you will have more or less seed left in it. I have found that it pays to take that mulch entirely off and cultivate, then put it back again just before fruiting time. In my own business I have to take it off because we take up all the plants except the original.

REPORT OF TREASURER.

W. C. COLTON.

RECEIPTS.

1917.		
Dec.	1	Cash on hand, \$ 378.65
	10	Cash from Sec'y, dues money, 62.00
1918.		
Jan.	1	Interest on deposits, \$ 3.08
	9	Cash from Sec'y, dues money, 13.00
	16	State appropriation, 500.00
May	22	Cash from Sec'y, dues money, 6.00
July	1	Interest on deposits, 9.02
Aug.	12	Cash from Sec'y, dues money, 8.00
		\$ 979.75

EXPENDITURES.

		Voucher	
		No.	
Dec.	12	E. H. West, Dorset, Vt., 798	\$ 22.50
		Eastern Fruit & Nut Orchard	
		Company, Burlington, Vt., 799	8.50
		C. L. Witherell, Middlebury, Vt., 800	6.00
		D. R. Miller, Putney, Vt., 801	1.00
		A. H. Hill, Isle La Motte, Vt., 802	3.00
		Luther Putnam, Cambridge, Vt., 803	7.00
		O. W. Hitchcock, Essex Jct., Vt., 804	5.50
		E. E. Hill, So. Hero, Vt., 805	3.50
		A. T. Clark, Vergennes, Vt., 806	3.00
		The Orchards, Bennington, Vt., 807	11.50
		R. H. Holmes, Shoreham, Vt., 808	1.50
	18	M. B. Cummings, Burlington, Vt., 809	12.45
		W. H. Wolff, Durham, N. H., 810	44.10
		W. W. Chenoweth, Amherst, Mass., 811	40.53
		Geo. D. Aiken, Putney, Vt., 812	9.44
		Geo. W. Perry, Chester Depot, Vt., 813	5.20
		W. C. Colton, Montpelier, Vt., 814	4.89
		Homer E. Bartram, Burlington,	
		Vt., 815	3.00
	26	Howard Relief Society, Burling-	
		ton, Vt., 816	22.02
		McAuliffe Paper Co., Burling-	
		ton, Vt., 817	3.85
		New Sherwood Hotel, Burling-	
		ton, Vt., 818	72.40
		E. H. Hallett, St. Johnsbury, Vt., 819	17.10

1918.			
Jan. 3	Free Press Association, Burlington, Vt.,	821	12.16
	E. H. West, Dorset, Vt.,	820	4.86
23	Miss S. A. Nott, Burlington, Vt.,	822	36.95
	McAuliffe Paper Co., Burlington, Vt.,	823	8.94
Mar. 22	Mrs. John B. Chase, Lyndon, Vt.,	824	5.00
	Free Press Association, Burlington, Vt.,	825	3.24
May 25	Miss Idris Roberts, Burlington, Vt.,	826	6.27
June 21	M. B. Cummings, Burlington, Vt.,	827	121.28
Aug. 7	Free Press Association, Burlington, Vt.,	828	2.10
Sept. 17	M. B. Cummings, Burlington, Vt.,	829	18.66
	Geo. D. Aitken, Putney, Vt.,	830	8.40
	Free Press Association, Burlington, Vt.,	831	2.00
	Miss V. I. Roberts, Burlington, Vt.,	832	4.02
Nov. 9	M. B. Cummings, Burlington, Vt.,	833	10.00
	Geo. W. Perry, Chester Depot, Vt.,	834	3.81
	Whitehead & Hoag Co., Newark, N. J.,	835	12.13
	Free Press Association, Burlington, Vt.,	836	17.00
15	Cash on hand,		394.95
			<u>\$ 979.75</u>

SUMMARY.

RECEIPTS.

Cash on hand,	\$ 378.65
Dues,	89.00
State appropriation,	500.00
Interest on deposits,	12.10
	<u>\$ 979.75</u>

EXPENDITURES.

Office expense, (postage, express, salary, etc.,)	\$ 218.93
Lecturers, (travel expenses,)	110.67
Premiums to exhibitors,	78.00
Miscellaneous, (hotel bills, supplies, printing, etc.,)	117.20
Cash on hand,	394.95
	<u>\$ 979.75</u>

REPORT OF SECRETARY.**M. B. CUMMINGS.**

The past year has been a most extraordinary one for horticultural people.

I wish in particular to introduce the subject of winter injury; mention some of the surprising things about horticulture work in war times, and to report briefly upon the annual orchard meeting.

Winter injury to fruit trees in Vermont during season 1917-18 was quite extensive throughout the State although the earlier reports seemed to indicate that greater harm had been done than had really been the case as the season advanced. Of course, newspaper reports are often exaggerated. However, the surprising thing is not that there was *some* injury, but there was not *more* than actually occurred. As far as can be ascertained the injury was about the same in various parts of the state in proportion to the number of trees in the respective areas. The varieties that were most severely injured were the Baldwin, Ben Davis, Pewaukee, Spitzenburg and Northern Spy. Recent plantings of McIntosh and N. Spy were also seriously injured.

In few instances small trees were seriously injured due primarily to the recent setting and perhaps the inability of the roots to become firmly established in the subsoil. In many places the trees were most injured which bore heavily in the season of 1917. A possible explanation here is that the trees were somewhat exhausted, and food needed for recovery was consumed so that there was scarcely the ability to recover at the opening of the season.

In some other cases the injury to such varieties as Spitzenburg, Pewaukee and Ben Davis was thought to be due to the late rains which were accompanied by warm weather, factors which hindered the trees from becoming toughened and hardened for winter. Whenever trees go into the winter in an immature condition there is likely to be winter injury even though the winter is not unusually severe.

In other cases the winter injury was only temporary in which cases it affected the twigs and buds. In the case of the Northern Spy it is reported that there was scarcely a crop anywhere in New England, but there were very few cases reported where the trees were entirely killed.

In other instances the winter injury was greatest in exposed places, or where trees were set in rather shallow soil. Cold air is dry, and unless the trees can get water from the soil to make good the loss by desiccation, there is death of live tissue.

In many cases the greatest injury was among cider apple trees, already weakened by insect injuries and sick with canker. Such neglected trees naturally succumb to severe winter weather. It will be a blessing to get rid of these old trees.

I have asked our County Vice-Presidents and County Agricultural Agents to cooperate in securing as full and as complete reports as possible on winter injury and to report to us at this meeting. This important data should be on record and be available to prospective orchardists.

The possibility of winter injury must always be one of the gravest risks of the fruit grower. Winter weather of great severity is beyond control. Aside from selecting hardy varieties and choosing sites for local protection, there are some things to recognize and to govern our action. They may be listed as follows:

(1.) Discontinue late summer or fall plowing, harrowing and fertilizing, as these operations encourage late growth and hinder the ripening and maturing of woody tissue, especially buds and twigs.

(2.) Poor drainage induces winter injury. Wet lands like late culture delay the ripening of tissues.

(3.) Low areas with poor air drainage are subject to winter injury. Hillside orchards were conspicuously free of injury this past year.

(4.) Midsummer cover crops that use food and moisture and divert it from the trees, are beneficial in lessening injury, for they hasten inactivity of buds and twigs.

The character of winter injury is still somewhat obscure, and has several phases. It may be due to the withdrawal of so much moisture from the twigs that death of the tissues ensues by desiccation,—the drying out of live cells. Cold air is dry, and cold waves are windy ones. The twigs lose moisture beyond recovery. In other cases the injury takes the form of frost cracks due to the freezing and expansion of water and ice within the tissues. In still other cases death results from absolute low temperature which certain plants, or varieties cannot withstand.

The treatment of winter injured trees depends on the degree of injury. Extermination is the thing for dead trees; moderate pruning for trees with only local injury,

as dead limbs are not only useless but detrimental; and finally immediate and general good care in the spring and summer.

With respect to avoidance of winter injury, I will suggest three things:

First, that more attention is given to hardy varieties.

Second, that we recommend better air and soil drainage and the choice high rather than low areas.

Third, that we recommend the discontinuance of all cultural practices in the late summer that stimulate and induce late growth and that hinders maturity of buds and twigs.

The Secretary is in receipt of a communication from Dr. L. H. Bailey of Ithaca, New York, President of the American Pomological Society which reads as follows:

"It is the desire of the American Pomological Society in reorganizing and extending its efforts, to develop a close working connection with the state and district horticultural societies of the United States and Canada. To this end I solicit the cooperation of the Vermont State Horticultural Society. The Secretary of the American Pomological Society undoubtedly has written your Society, but I desire personally to bring the matter to your attention so that action may be taken at your next meeting, hoping that the cooperation may go into effect for the biennial session of 1919.

"Enclosed you will find a copy of the resolution on Society Memberships adopted by the American Pomological Society. I trust it will commend itself to the good will of your Society.

"The American Pomological Society is nearly seventy years old. It has had a useful history and has maintained a high standard throughout, contributing much to the dignity and standing of American fruitgrowing. It should represent the entire continent, bringing the pomological interests together, aiding and strengthening all the societies. It is now time for a coordination of effort, without in any way interfering with the work or affairs of any of the organizations. Will your Society join with the others for a general forward movement?

"The resolution which was adopted and which has been distributed in relation to this cooperative proposition reads as follows:

"That there be hereby established a membership in this body to be known as Society Membership, which shall be open to state, provincial and district organizations. The fee for such membership shall be, for a State or Provincial

Society, ten dollars, and for a district society five dollars, the biennium. This membership carries with it the right and duty to appoint delegates, one for each hundred members, or major fraction thereof, and one delegate-at-large, of the delegating body, to attend and participate in the meetings of this Society; and in addition to these delegates a State or Provincial society member shall nominate the State or Provincial vice-president, such nomination to be made and submitted in writing, properly attested by the president and secretary of the delegating body, to the Secretary of this organization ten days prior to the date of the biennial meeting next preceding the period for which such nominee is designated to serve. A State or Provincial society member shall be entitled to receive six copies of the proceedings of this Society; a district society member shall be entitled to receive three copies of the same publication.

"Delegates from the above Society Members shall be entitled to all the privileges of other members of this Society; but in case of the appointment of alternates, no alternates, shall have a right to vote except in the event his principal elects to divide his privilege thereby casting a one half vote for principal and alternate."

My personal and official opinion is that we should accept this invitation as it will add much to the interest, influence and instruction of our Society people. If we enter into such relations as are indicated we become related directly to this larger Association.

The eighth annual summer meeting of the Society was held in Middlebury and Bristol on August 30th. Under the shade of old apple trees at Belmont orchards of C. L. Witherell in Cornwall, about three miles from Middlebury there were about 75 people for the annual orchard meeting. A basket lunch was enjoyed in the shade and fragrance of heavily loaded trees of Spies and Pippins with Mr. and Mrs. Witherell as hosts, who provided coffee and apples which helped to make an enjoyable lunch.

Soon after noon a party started on an auto tour to the big orchards of the County. The party reviewed with interest 100 acres of C. L. Witherell's orchard consisting of Spies, Wealthy, Delicious, Winter Banana and McIntosh; 40 acres of Spies and Tolman Sweets at R. L. Hemingway's at Bridport; 20 acres of Wolf River, Alexanders and McIntosh at John Sperry's at Shoreham; 30 acres of Spies and McIntosh at W. J. Anderson's; 60 acres Ben Davis, McIntosh and Spies at John Stevens', and some other places.

The other section of the meeting was held at Bristol which brought attention to one of the most interesting

sights of the year. In the orchard of T. S. Casey there were a few acres of heavily loaded trees of Spies, McIntosh and Baldwins. It was surprising indeed to find Baldwins bearing heavily in the fall of 1918.

In connection with the orchard trip the presence of many women assisted much in the basket lunch and lent much gayety to the auto tour.

The evening lecture on Charming Vermont by George W. Perry revealed the many beautiful spots in the Green Mountain state and gave much inspiration. What to see and how to enjoy our beautiful landscape is a matter of as much importance to most of us as what to plant and how to produce.

Let me add just a few words now in regard to the importance of horticulture in war times.

It has been a matter of surprise that the horticultural industries have stood the strain of war conditions so well. Some prophets told us that much of our work would go to the wall if this war continued. Well, what are the facts? Let us take a few instances to show our status just now. A little over a year ago, the citrus growers of California were anxious to market their crop, and the government guaranteed the cars, later they feared for the peach crop, but the government contracted for one-third of the crop to be dried and sent to the cantonment camps. The total prune crop of Oregon has been commandeered by the Government and one-half of the entire canned tomato crop has also been taken. Last spring the southern truck growers were fearful for their markets, but even here in Northern New England there were sent in carloads of onions from Texas, watermelons and peaches from Georgia, and strawberries from New Jersey. Better peaches could be bought this season than for many a year.

The prices have also been good. Notwithstanding the increased production due to the food and war garden campaigns, there has been a keen market, and a high price. The usual extreme fluctuations have not affected horticultural products as much as many other things. Think of wheat, flour, and potatoes for instance, which are generally regarded as staple, and yet potatoes have varied from \$4.00 to 60 cents per bushel within the last 16 months. Soon after harvest last fall potatoes declined gradually in price toward Spring, while apples increased in price. Can anyone remember when early apples were selling for more than 4 cents a pound at retail?

Consider the following retail prices:—

Beets, pound,	.03	Apples, each,	.03—.05
Cabbage, pound,	.05	Almonds,	.35—.40
Cauliflower pound,	.25—.50	Crabapples, pk.,	.50
Carrots, pound,	.03	Grapes, basket,	.30—.40
Celery, bunch,	.10—.30	Lemons, dozen,	.50
Lettuce, head,	.12—.18	Nuts, mixed lb.,	.25
Onions Spanish,	.10	Pears, Bartlett, doz.,	.50
Peppers green each,	.04	Filberts, lb.,	.25
Turnip, pound,	.03	Walnut meats, lb.,	1.00

The great demand for canned and dried products has been a boon to the horticulturists. Many of the people have come to depend on the milk bottle and the tin can. Are they not of about equal importance? Just as the Civil War led to the perfecting of condensed milk, so this great war is perfecting the dehydration of fruits and vegetables on a commercial scale. This means a great saving of waste, a stabilizing of prices, and a simple condensed form for transportation.

I wish to state the very great loss this society has sustained in the death of Ex-Gov. G. H. Prouty of Newport. Some of you will remember how interested Mr. Prouty was in the meeting at Newport which was held while he was Governor. Some of you also remember that he was always ready and willing to contribute willingly in connection with some of our special efforts for extraordinary exhibitions. On several different occasions he sent the Secretary a check for \$50, to enlarge the premium list. His interest and enthusiasm was a great asset to the State.

REPORTS OF COUNTY VICE-PRESIDENTS.**ADDISON COUNTY.**

C. L. WITHERELL, MIDDLEBURY.

A little time ago I looked over some reports that I got through the County Agricultural Agent at Middlebury and have incorporated them.

I will take up the winter injury first. These reports showed that the Greenings, Baldwins, and Ben Davis and Spies suffered more than any other varieties. The per cent reported, I think, was from 12% to almost none. This covers reports of seven or eight growers in Addison County. The largest loss in Middlebury, was on plums and cherries. At Bristol a few commercial orchards reported almost no loss. One of our largest growers, and largest bearing orchards perhaps, in Addison County, is that of John Stevens of Orwell who reported a 5% loss, which seemed to have affected the trees of bearing age ranging from 15 to 20 years old. Trees that bore a heavy crop the previous year, which very likely were reduced somewhat in vitality were also injured. Our personal loss at our home orchard in Cornwall was very slight in bearing trees for we lost only nine out of 2,200. Another orchard in Shoreham suffered quite severely for they were planted in 1917, and lacked in vitality when they were planted. They were not as full of sap as they might have been, but we planted them and they didn't do well, so I hardly think they should be counted as winter injured.

The crop of fruit in Addison County was of very good quality. It was reported to be 60% of full crop. The prices ranged from \$2 to \$4, and up, to local buyers. Some who shipped their own fruit realized much more.

The young orchards received the usual care the past season. All were short of help, and some did not till as much as they should, but there are others who made inter-crop plantings to induce more growth on their young trees, and to get more return from the land.

CALEDONIA COUNTY.

E. H. HALLETT, ST. JOHNSBURY CENTER.

I think that Caledonia County was the hardest hit of any county in the State in regard to apples, small fruit and

vegetables. We had a severe winter, and while perhaps the thermometer did not go as low as in some sections, it was low enough, registering sometimes 65 below zero.

I endeavored to find out the percent of winter injury throughout the county, and I think it is safe to say it would range from 40 to 100%. We have no large commercial orchards in the county, although there are some people who have raised quite a good deal of fruit, most of it for the home market. One man in the town of Barnet, had 1,200 bushels last year but none this year. The winter injury there was very severe.

I think that Ryegate, Peacham, a portion of Danville and a part of Derby are the only three towns that had any apples this year. There was no difference in regard to variety as to the extent of injury. We had a good many small trees, set some six years ago, and I have looked forward to this meeting expecting that Caledonia County would furnish something on these tables, but there are no apples from this county.

There are a good many commercial gardeners here who were handicapped somewhat this year owing to the very early spring. We all got anxious and excited and planted our gardens early only to have them practically all killed on the 20th of June. I think, with the exception of this village, that nearly all of the gardens were injured to the extent of 50%. We had a very short growing season, and the nights were cold. Vines did nothing. I have not seen or known of but a very few, and I don't know as there were any thoroughly ripe squash here in the county. Some were brought in, but they were not very nice. Squashes have been shipped in from Massachusetts where they had an abundant crop. The summer was short because the fall frost came early in September and destroyed practically all of the beans and a good many other things so that the crops were raised were small. Cabbages did well, although but few were raised for the market. Beans would have been a money crop provided they could have been harvested. There were several farmers that had from 10 to 15 acres of beans that were a total loss.

The people in Caledonia County are not discouraged unless it is along the line of fruit growing. As to apple trees I should judge they are quite likely to be somewhat discouraged, and will fail to replant very much, and I doubt sometimes myself whether it is practicable. We have had more or less winter injury for the last 30 or 40 years. Some of these young men that are going on to our farms may have courage enough to plant, and with different methods

in culture they may succeed with hardier varieties and well chosen sites for orchards.

GRAND ISLE COUNTY.

GEORGE W. PERRY, CHESTER DEPOT.

The fruit situation in Grand Isle County is almost inexplicable. Of course that county always had the reputation of having the mildest winter of any place in Vermont, and yet I think last winter it hit the apple trees the hardest of any place, unless it was Caledonia County. There are quite a good many problems growing out of severe winter. Practically, I think the trees were tenderer because they had had milder winters before than in places where they had it colder. We supposed that the thermometer in that county, along the shores, wouldn't go more than 18 degrees below zero but it went forty degrees below last winter. It took practically every Baldwin tree in our section of Grand Isle County. It took a lot of Northern Spy trees of about 15 years of age. It did not take very many of the old, big trees, nor of the young trees, but did kill Northern Spy trees just coming to bearing well and about 15 years old. Elmer Hill is our best apple man in that county. He and I looked over quite a bit and made the discovery that almost without exception, the orchards that were hit hard, were those that had peas or beans in them the summer before, so that the land was bare with no growth upon it when the winter came, while the orchards that were in grass, with one or two exceptions, were not hurt. His conclusion was that in these orchards, where the land was bare, the roots were killed because these trees leaved out and then died in mid summer. The roots were killed and did not give the trees any nourishment. We have one early apple, called the Champlain that was killed entirely. Quite a good many Greenings were injured, but there was not a McIntosh tree or a Snow tree hurt. Every one of them that budded, bore. The Ben Davis, Yellow Transparent and Early Williams stood it pretty well. The damage to trees, I should say in my part of the county, was about 15% or 20%. It was total so far as the Baldwins were concerned. The plum trees were not seriously injured, except where they were kept cultivated. I did not cultivate my Baldwin trees a year ago last summer, and I think I saved them that way. The cherries and plums bloomed some but did not bear any fruit because there were no bees. The winter killed all the wild bees and a great many of those on the farms. I did

not see a honey bee early in the spring, but a little bit later, when the apple trees bloomed, there were a few bees at work on them.

We did not have any frosts from the first of May till the 7th of October to hurt anything, so our gardens grew well, but it was so cold they were late. We had great crops of strawberries, but no plums or pears. We had a great time trying to get any corn, because of the rain and cool nights, but our canning factory put up 8,000 cases.

When I came away, I estimated that there would be on Grand Isle, which is 36x3 miles in extent,—40,000 barrels of beans, worth \$5 a bushel. That would make \$200,000 just for beans for a little community of 1,600 inhabitants. On the whole the farmers are very prosperous, and are receiving great profits. No farmer is complaining about the price of butter or milk. Perhaps the farmers are getting too well off. They do not attend to their farms, they have automobiles, electric lights and bath rooms, and they are a little inclined to be running off for a good time. The young men that are staying on the farms in that county and are doing good service, and are happy.

LAMOILLE COUNTY.

LUTHER PUTNAM, CAMBRIDGE.

I want to say, to these young men who have come up here from the State Agricultural School of Lyndon that I have seldom seen a party of young men that pleased me more. They look as though they were growing up to be useful. I hope they be engaged in horticulture enterprises.

Lamoille County is very much like Caledonia, only we have two commercial orchards. Perhaps there may be three or four others that might be called commercial but the hard winter of course injured the trees. We never calculated the Fameuse would resist extreme cold but it did, except that it was injured on the tips of the limbs. It has been a most terrible year with us with the frosts and hailstorms in July, and fearful rain storms at other times. The McIntosh, Fameuse, winter sweets and King David showed no results of hard winter. The Baldwin and Greening were not injured because they were grafted on hardy stock. We should never set out a Baldwin or Rhode Island Greening tree on its own roots, but top graft on hardy stock. The Tolman Sweet and the McIntosh and Fameuse are good trees, and one need not be afraid to set them if he takes care of them.

WASHINGTON COUNTY.

W. C. COLTON, MONTPELIER.

Washington County has not already advanced beyond what our president calls the "first incarnation". The commercial orchard has not arrived there to any extent. There are a few apples grown around Montpelier, but they are not in any sense commercial, but the influence of this Society is very great. This is an important function of this society, namely to develop markets. I wish the people of St. Johnsbury would come in here and see this fruit and develop a taste for it.

I want to say a word for Washington County in regard to our public market. A volunteer committee there had charge of it for two years. Land was taken at the rear of the city hall, and in rainy weather the markets were held indoors. The farmers were requested to bring in their products and offer them for sale. The volunteer committee provided tables, with officers to supervise them. The products were brought in and placed on the tables by the farmers and farmer's wives, and you would see the townspeople streaming down town with baskets on their arms, to be filled at the market. The first year they had the market on Saturdays, but beginning this year they have held it on Tuesdays and Saturdays. The market gardeners who have in the past made a specialty of raising vegetables, we felt might not take to this, but they are loud in their praise of it because they would take their loads of produce to this public market and dispose of it all there without the bother of running around town to peddle. I feel that this is a very interesting experiment which has turned out splendidly for all concerned, and I believe the larger towns in Vermont might adopt it with profit.

WINDHAM COUNTY.

GEORGE D. AIKEN, PUTNEY.

Winter injury in Windham County was not as great as in some other counties in the State. The county agents estimate that some orchards lost 20%, but instead of losing the trees in prime bearing age, most of the loss was from trees in their third year of growth. The early reports were misleading. We thought the peach trees were practically all killed also the McIntosh apples, but the McIntosh came through the winter uninjured, while those peach trees,

which were apparently dead, have started out and more than made up for the growth that was killed, so that the only loss was one year's crop. Other apple trees, as in other parts of the State, died back some afterwards. The loss was probably greatest among the Baldwin trees. Cherries and plums came through uninjured. The plums did not bear any, while the cherries gave 30% of a crop. The pears did not blossom this year. Cuthbert raspberries survived clear to the tip. Rose bushes and wisterias lived through practically uninjured, and the same is true of some of the shrubs which are supposed to be half hardy.

The crop of raspberries, strawberries, gooseberries was the best we have had in years. Blackberries winter killed with the exception of the Eldorado. Berries as a crop were very profitable. I estimated that the strawberry crop averaged in value about \$1,000 a car, because we did not have to sell any for less than 20 cents a quart. The vegetable crop was very good. Much wheat and other staples were planted. We had almost an ideal season in the fruit sections of Windham County. At Putney we had our last spring frost in April and the first fall frost on Oct. 7th. It rained practically every Sunday, through the spring and the early summer, but did not rain a day during the raspberry picking season.

AWARDS IN 1918.

CLASS I.—APPLES.

Plate Exhibits.

		Prize.	Amt.
Arctic, Baldwin,	W. C. Holcomb, Isle LaMotte,	First,	\$1.00
	The Orchards, Bennington,	First,	1.00
	W. F. Ranney, Westminster,	Second,	.50
Banana, Bellflower,	A. T. Clark, Vergennes,	Third,	.25
	C. L. Witherell, Middlebury,	First,	1.00
	W. F. Ranney, Westminster,	First,	1.00
Bethel,	C. L. Witherell, Middlebury,	Second,	.50
	W. C. Holcomb, Isle LaMotte,	First,	1.00
	L. Putnam, Cambridge,	Second,	.50
Delicious,	C. L. Witherell, Middlebury,	First,	1.00
	W. F. Ranney, Westminster,	Second,	.50
	A. T. Clark, Vergennes,	First,	1.00
Fameuse,	C. L. Witherell, Middlebury,	Second,	.50
	The Orchards, Bennington,	Third,	.25
	A. T. Clark, Vergennes,	First,	1.00
Golden Russet,	L. Putnam, Cambridge,	Second,	.50
	The Orchards, Bennington,	First,	1.00
	W. F. Ranney, Westminster,	Second,	.50
Hubbardston,	W. F. Ranney, Westminster,	First,	1.00
	A. T. Clark, Vergennes,	Second,	.50
	W. F. Ranney, Westminster,	First,	1.00
King,	C. L. Witherell, Middlebury,	Second,	.50
	Diamond A. Orchards,	Third,	.25
	L. Putnam, Cambridge,	First,	1.00
McIntosh,	C. L. Witherell, Middlebury,	First,	1.00
	The Orchards, Bennington,	Second,	.50
	The Orchards, Bennington,	First,	1.00
McMahon White, Northern Spy,	W. C. Holcomb, Isle La Motte,	Second,	.50
	L. Putnam, Cambridge,	Third,	.25
	A. T. Clark, Vergennes,	First,	1.00
N. W. Greening,	The Orchards, Bennington,	Second,	.50
	A. T. Clark, Vergennes,	First,	1.00
	The Orchards, Bennington,	Second,	.50
Pewaukee,	W. F. Ranney, Westminster,	First,	1.00
	The Orchards, Bennington,	Second,	.50
	A. T. Clark, Vergennes,	First,	1.00
Red Canada,	W. F. Ranney, Westminster,	First,	1.00
	The Orchards, Bennington,	Second,	.50
	A. T. Clark, Vergennes,	Third,	.25
R. I. Greening,	A. T. Clark, Vergennes,	First,	1.00
	L. Putnam, Cambridge,	Second,	.50
	W. F. Ranney, Westminster,	First,	1.00
Scott Winter,	A. T. Clark, Vergennes,	Second,	.50
	The Orchards, Bennington,	Third,	.25
	C. L. Witherell, Middlebury,	First,	1.00
Spitzenburg,	W. C. Holcomb, Isle LaMotte,	Second,	.50
	C. L. Witherell, Middlebury,	First,	1.00
	Diamond A. Orchards, Shoreham,	Second,	.50
Tolman Sweet,	The Orchards, Bennington,	Third,	.25
	W. F. Ranney, Westminster,	First,	1.00
	L. Putnam, Cambridge,	Second,	.50
Wealthy,	W. F. Ranney, Westminster,	First,	1.00
	The Orchards, Bennington,	Second,	.50
	W. F. Ranney, Westminster,	First,	1.00
Wolf River,	L. Putnam, Cambridge,	Second,	.50
	W. F. Ranney, Westminster,	First,	1.00
	The Orchards, Bennington,	Second,	.50
Sutton,	W. F. Ranney, Westminster,	First,	1.00
	The Orchards, Bennington,	Second,	.50
	W. F. Ranney, Westminster,	First,	1.00

Honorable Mention.

Twenty Ounce, Jonathan, Bismarck,	W. F. Ranney, Westminster, A. T. Clark, Vergennes, Diamond A. Orchards, Shoreham.
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CLASS II.—ARTISTIC APPLE DISPLAY.

Best collection named varieties exhibited on plates	C. L. Witherell, Middlebury,	First,	\$5.00
	W. F. Ranney, Westminster,	Second,	3.00
	The Orchards, Bennington,	Third,	2.00
Best display of cooking apples on plates	L. Putnam, Cambridge,	First,	5.00

CLASS III.—PACKAGE EXHIBITS.

Best exhibit in box package, (3 boxes)	C. L. Witherell, Middlebury,	First,	5.00
Best single box	C. L. Witherell, Middlebury,	First,	5.00
Honorable mention box of Bananas	C. L. Witherell, Middlebury.		

CLASS IV.—CANNED FRUITS.

Best display of canned fruits	Clara Hallett, St. Johnsbury,	Second,	2.00
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CLASS V.—PEARS.

Plate Anjou	C. L. Witherell, Middlebury,	First,	1.00
	A. T. Clark, Vergennes,	Second,	.50

CLASS VI.—VEGETABLES.

Collection named varieties of Beets	E. H. Hallett, St. Johnsbury,	First,	1.00
	L. Putnam, Cambridge,	Second,	.50

Carrots.

E. H. Hallett, St. Johnsbury,	First,	.50
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Celery.

E. H. Hallett, St. Johnsbury,	First,	1.00
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Cabbages.

E. H. Hallett, St. Johnsbury,	First,	1.00
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Onions.

E. H. Hallett, St. Johnsbury,	First,	1.00
L. Putnam, Cambridge,	Second,	.50

Turnips.

E. H. Hallett, St. Johnsbury,	Second,	.50
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BUSINESS SESSION.

Chairman E. H. Hallett of the nominating committee recommended the election of the following officers:

For President, George D. Aiken of Putney.

For Secretary, M. B. Cummings of Burlington.

For Treasurer, W. C. Colton of Montpelier.

For Auditor, A. T. Clark of Vergennes,
and for the Executive Committee the following: George D. Aiken, M. B. Cummings, E. S. Brigham of St. Albans, R. R. McRae of Castleton and C. L. Witherell of Middlebury.

The secretary was ordered to cast one ballot for the officers given above and they were thereby elected.

The president and secretary were authorized to appoint the county vice-presidents, and their names appear on the front page of this report.

President Aiken appointed C. L. Witherell of Middlebury to represent the Society at the New England Fruit Show in Portland where the final conference of the New England Horticultural Societies was held to adopt a proposed uniform apple grading bill for all the New England States. Mr. Witherell was also appointed to represent the Vermont Society at the next Legislature and to cooperate with the Vermont Commissioner of Agriculture in securing the desired law.

Secretary Cummings called attention to the proposed uniform apple grading bill for all the New England States saying that the organized growers in New England seemed to be strong for it. Copies of the bill were passed to those present and other copies were to be mailed to the growers of the state. The secretary said that whereas there was opposition to separate laws for the several states such opposition now seemed to be removed by the adoption of a uniform bill for all the New England States.

George W. Perry of Chester Depot was appointed a delegate to represent the society at the next informal council to be held at the University of Vermont.

NEW PUBLICATIONS IN HORTICULTURE.

Manual of tree diseases, by W. H. Rankin, Professor in the Department of Plant Pathology in Cornell University. The diseases of the more common trees of the United States are treated in this column. The casual agent of the diseases is briefly described, and when it is caused by a parasite some details of the parasite's life history and activities are given with suggestions as to control. Special attention is paid to tree surgery. (By Macmillan Co.)

Manual of vegetable-garden insects, by C. R. Crosby and M. D. Leonard of Cornell University. (Illustrated.) This is a practical account of the principal insects which attack truck and vegetable crops, including cabbages, cauliflowers, cucumbers and melons, asparagus, potatoes, tomatoes, celery and parsnips, lettuce, peas, beans, beets, spinach, sweet potatoes and sweet corn. The life-history and habits of each insect are given and its injuries described. (By MacMillan Company, 64 Fifth Ave., N. Y. City.)

The Home Fruit Grower, by M. G. Kains. A compact manual, attractively illustrated, covering the needs of the home garden very thoroughly. Nuts are discussed, as well as tree and brush fruits, and all the details of propagation, planting and culture are covered, also insects and diseases. The book is copiously illustrated, and well indexed. Published by the A. R. De LeMare Co., New York; price, in ornamental stiff paper cover, \$1.00; in cloth, \$1.50.

The Potato Magazine, Official Publications of the Potato Association of America. Monthly \$2.00. Address Wm. Stuart, Sec., Dept., of Agr., Washington, D. C.

Market Growers Journal. The market gardener's trade paper at \$1.50 per year. It appears twice a month from Louisville, Kentucky.

LIST OF MEMBERS.

Anybody interested in horticulture in any of its phases,—the culture of fruits, flowers or vegetables, or ornamentals or the marketing or preserving of these products, is eligible to membership. Annual membership costs \$1.00; life membership \$5.00, with back reports.

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Wiltfranck, F.	South Hero	Young, A. I.	Barre
Winslow, Chas.	N. Clarendon	Young, I. R.	Montpelier
Wister, J. C.....	Germantown, Pa.	Young, L. P.	Montpelier
Witherell, C. L.....	Middlebury	Yout, C. E.....	Middlebury

SEVENTEENTH
ANNUAL REPORT
OF THE
Vermont State
Horticultural Society

PROCEEDINGS

OF THE

Twenty-third
Annual Meeting and Exhibition
held at Rutland, Vt.,
November 19-23,
1919.



**OFFICERS OF THE VERMONT STATE
HORTICULTURAL SOCIETY.**

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ADDRESS OF WELCOME.

HON. WALTER S. FENTON, RUTLAND, ON BEHALF OF
GOV. P. W. CLEMENT.

*Members of the Vermont State Horticultural Society,
Ladies and Gentlemen:*

Out of the many truisms which are ascribed to the pen of Shakespeare, perhaps there is none that more truly typifies my situation than the last clause of the epigram that runs something like this: "Some are born great; some achieve greatness; and some have greatness thrust upon them;" and it is in the character of those styled in the last clause that I appear here to-night.

I know that it is a keen disappointment to Governor Clement not to be able to personally extend the welcome to this organization. I know what his feelings are towards the objects of this association, and I know how strongly he feels towards the betterment of the fruit industry in Vermont, for he has talked to me a great many hours about that side, and when yesterday he received a message which summoned him to New York on a business matter, he told me that he had to go within an hour and that he expected I would either appear here and represent him or procure some one else, and that he felt the disappointment very keenly. I did the best I could to get Lieutenant-Governor Stone to come here, but owing to a previous engagement that was impossible, and so I appear here representing His Excellency, and for the lack of a more suitable welcome I ask your indulgence.

The apple has always been a product that excited admiration, and sometimes it was tempting. You know way back in the very early history of the world, not a very great while after the creation was completed, a woman was tempted by an apple, and I feel perhaps an injustice was done to her, that she should be criticized so severely. I am possessed of a fair degree of honesty and good intentions, and if some of these exhibitors should miss some of their fruit after I go out, I want to ask them to indulge me a little and say that, like Eve, I was too sorely tempted.

I have in mind a little incident that happened in Montpelier during the last session of the legislature. I think, with the backing of this Society, a bill was introduced in

the legislature which had for its object the more honest grading of fruit, the publication on the packages of the kind and grade of contents, etc. I learned something at that time about the method of apple grading. The father of your President told something about the way that some people in his locality did, who I assume were not members of this Society. The rule he laid down was this: "One hole, No. 1. Two holes, No. 2." The object of this bill was to do away with that kind of grading. A good many people learned something about apples in connection with that bill.

Before the bill finally came to its conclusion I think some of the apple growers learned something about politics. To some who were there some other projects did not possess quite so much merit, though they had the best politicians on the other side, and to the great misfortune of those interested in better apples, they loaded the barges with myrrh and frankincense and cast the apples overboard. While that wrecked the apple bill it did not finally succeed in making the Barge Terminal Bill a law because the Governor vetoed it.

While I have had the greatness thrust upon me of welcoming this association, I want to say that it has been a great privilege as well as a duty to have the opportunity, in the name of His Excellency, and I also speak the sentiment of the people of the city of Rutland, when I extend to this association a very cordial welcome on this occasion.

RESPONSE TO ADDRESS OF WELCOME.

PRESIDENT GEO. D. AIKEN.

Mr. Fenton, Ladies and Gentlemen:—

It is fitting that we should meet in Rutland this year not only because Rutland is the geographical center of the apple growing districts of Vermont, but also because Rutland County loyally supported the Honest Packing Bill in the last legislature. With the exception of one Senator, that support was unanimous.

If anyone adulterates Vermont maple sugar he runs afoul the law; if he sells Vermont butter of inferior quality, he is liable to be prosecuted, but if he fraudulently packs and sells Vermont apples, he is immune.

A hundred times I have heard it said that by using proper method of cultivation, spraying, pruning, etc., Vermont growers can grow as good apples as Oregon. To say this is all wrong; Vermont *does* grow apples as good and better than Oregon, but Oregon has a strict law against fraudulent grading so that only the finest of their fruit ever reaches the Eastern markets, thus giving the impression that all the apples they grow are of that kind.

I do not mean that Vermont growers are dishonest, but I do mean that our failure to enact proper grading laws does permit one shipper, not necessarily a grower, to injure the reputation of a hundred honest growers. Indeed, I believe the main opposition to the grading bill comes from speculators, not growers. And at this time, I wish to thank the people of Rutland County for their support of that measure which will eventually give Vermont growers the same protection against dishonest apple grading that the growers of other states now enjoy.

PERSONAL EXPERIENCES IN FRUIT GROWING.

PROF. F. C. SEARS, AMHERST, MASS.

While I realize that every man's problems are a little different from every other man's; yet on the other hand there are a great many questions which confront us all that are strikingly similar.

In my discussion this evening I have tried to select a few of the many questions that have confronted us at the Bay Road Fruit Farm in Amherst, which might be helpful to at least *some* of our neighbors in Vermont.

I. ADDITIONAL PLANTINGS.—Shall we set more orchards? While we already have about 120 acres of orchard from one to eleven years old, we believe so thoroughly in the future of the orchard business that we are continuing to plant more orchards and expect to set ten acres more in 1920. In our older plantings the following five varieties are our leaders: McIntosh, Baldwin, Wealthy, Oldenburg and Wagener. In this new block of ten acres we shall continue these varieties but shall add Delicious as we want a high class dessert apple to follow McIntosh. The list that we already have gives us a good succession, starting with Oldenburg in August, and ending with Baldwin and Wagener which will keep till late winter or early spring. As a matter of fact we have smaller plantings of still earlier varieties that extend our season to near the first of August. This is a great advantage not only because it extends the period of marketing and of income, but still more because it lengthens the time of picking and handling. It might be of interest to say that we are planning to set the standard trees in this 1920 block at 50 x 50 feet.

II. PRUNING.—My notions of pruning have undergone a decided change in the last twenty years and especially in the ten years we have been growing these orchards. Formerly I thought young trees should be severely pruned from the time of setting until they came into bearing. Now we prune severely at setting, but from that time till the trees come into bearing we do just as little pruning as we can and still have the trees shape up well. After they once come into bearing, we can do somewhat more severe pruning to advantage to thin the tops and let in the light. Another change of ideas which has been forced on us by the amount of pruning we have to do, is the season in which we

do the work. We shall begin this work this month or early in December, in order that our foreman and one or two helpers may have time for our twenty thousand trees.

III. FERTILIZERS.—One of our most serious problems has been the question of soil fertility. We have a light soil which, while it is easy to work, gives us good color, and brings our trees into bearing fairly early, yet it needs humus badly if it is to be kept in a sufficiently good condition as to moisture and fertility to give us a good growth on our trees. And very frequently humus is just what we cannot get. We do not have a supply of barn manure and we cannot always get a good growth of cover crops.

We have been surprised to find that in all of our blocks of orchard the soil is sour. And while we do not have conclusive evidence to show that lime is necessary to give us the best fruit from our trees, there is some evidence in that direction, and we *do* know that we must have it to grow the leguminous cover crops that we need. We are therefore using lime very freely, having bought two car loads this autumn and planned for two more cars next spring.

We are also trying to get the largest possible amount of humus from cover crops and have found buckwheat, barley and millet, combined with either clover or vetch, the most satisfactory crops for this purpose. We also have not hesitated to use tall-growing weeds as covers. This may strike you as a curious and perhaps as a mistaken practice, but can anyone tell me in what way buckwheat is better than a good crop of pig-weed for a cover in orchards? Why not use what we can get for nothing?

We are using nitrogen and phosphoric acid freely as fertilizers, especially the former. Our treatment of a block of 10-year-old Wealthy trees this year may be of interest. The trees blossomed full and set a heavy crop of fruit. And as they were on light soil and not growing very vigorously it was evident that we must stimulate them in order to get satisfactory size on our apples. We therefore applied the following fertilizers per acre:

500 lbs. Amophos
300 lbs. Nitrate of Soda
200 lbs. Flue-dust

This was given in three applications, the first just before blossoming, the second a month later and the third a month after the second. As Amophos carried nitrogen in about equal quantity to nitrate of soda this was heavy feeding but under our conditions of a light soil and a heavy crop

it was amply justified. We got fine size, high color and splendid foliage, which ought to help our chances for a crop in 1920.

IV. LIVE STOCK.—With our soil conditions we are convinced that we cannot make our trees do their best without some barn manures and we are therefore seriously considering keeping some sort of live stock. We have always kept some hogs and have every winter filled a big barn with cows, sometimes buying them either locally or in Vermont, but this year have made an arrangement with a local cow-dealer to board twenty head for the winter. We are getting \$2 a week for care and roughage, he to furnish grain and we to have the manure. This seems like a satisfactory arrangement if we can keep it up. We have sometimes thought of buying western cattle and fattening them. Whatever the solution we are satisfied that *we must have barn manure*.

V. SMALL FRUITS.—We have always grown more or less small fruits, especially strawberries and shall continue to do so. We have an excellent type of soil for them, they fit in well with our other work, keep our huckster busy and give us an income when there is none coming in from the orchard.

The best crop of strawberries we ever grew was on land handled as follows:

We plowed down a grass stubble as soon as the hay was off and manured it well, discing the manure in. Then we sowed turnips about August 1st. As soon as the turnips were off, about November 15th, and we got a splendid crop of turnips, the land was plowed again very shallow so as to turn down the manure just a little below the surface. In the spring the land was well fitted and the plants set. With this well-rotted manure to feed on they made a fine growth at once which they kept up right through the season. In addition, the following fertilizers were put on the bed in two applications, one just as soon as the plants were set and the second one a month later:

500 lbs. acid phosphate
800 lbs. tankage
150 lbs. nitrate of soda
200 lbs. flue-dust

Our crop was not phenomenal but ran somewhere around 9,000 quarts per acre.

VI. TRACTORS.—I do not suppose there are many orchardists in Vermont who are considering the question



U. V. M. students observing the use of the apple crate.



In the C. T. Holmes Orchard at Charlotte. View between the rows of
50-year-old Rhode Island Greening trees.

of buying a tractor but to those who are our investigations may possibly be helpful. We have had for three years past a low-priced inefficient tractor which has been more trouble and annoyance than help to us. We are expecting to buy a new and better one in the spring and our choice will be either a Fordson or a Cleveland. The former has the advantages of being cheaper and easy to operate, and the fact that it is made by the Ford people is a fair guarantee that it is a practical machine. The Cleveland while costing more is especially good for orchard work because of its being so low down that it can get under the trees, and also that it requires so little space in which to turn. At this writing the chances seem to be in favor of the Fordson but we have not yet decided.

VII. LABOR.—Another matter to which we have given a good deal of attention is the question of labor. A whole lecture might be devoted to this question alone but I may say that we think the following are some of the most important factors in having good and efficient help:

1. Get good men! Some men are more bother than they are worth.

2. Furnish them with houses. The best man to have is a married man because he is more likely to settle down and stay with you, and you can't get such a man unless you have a house to offer him.

3. Pay your men well. There is no profit in having a man who thinks he isn't getting enough money. If a man isn't satisfied with what you are paying him either raise his pay or fire him!

4. Pay your men for the time they are sick. They will more than make it up to you in greater interest and better work.

5. Keep track of what your men do from day to day; if it isn't enough find out why they didn't do more.

6. Get your men interested in their rate of accomplishment, so many trees pruned or so many barrels of apples picked. Any man who is worth keeping will take more interest and do more work if he knows how much he has done and knows that *you* know.

7. Fix the responsibility for the work. Don't let four men pick on one apple tree but put one man to a row. Then you know which man it is who harvests the fruit spurs and which man leaves the stems to the apples on the trees.

VIII. APPLE SIZERS.—As another means of speeding up our work we have bought an apple-sizer. After canvassing the situation carefully we decided on a Gifford as best suited to our needs. It works rapidly, is moderate in price, and while it occasionally bruises an apple in the main it handles them well.

IX. PACKAGES.—The last question which I shall discuss is the one of packages in which to handle and market our fruit. I do not feel that we have yet settled that question satisfactorily. Our practice is this—We pick into the ordinary, swing-bale, half-bushel baskets and from these transfer the apples to barrels in which they are taken to the packing house or storage cellar. Sometimes we pour them from the basket into the barrel and sometimes each apple is placed in the barrel. Probably we ought always to use the latter method but we don't! When we are ready to market the apples, whether that be the next day or three months later, the apples are run through the sizer and packed into the ordinary, round, 14-quart peach basket in which they go to market. This basket is fairly well suited to our needs being cheap, light, attractive and well known in our markets. On the other hand it is frail, easily tipped over and is *not* a good package in which to ship fruit, though millions of bushels of fruit go to market every year in it. As our fruit is either sold right on the farm or goes to market in our own truck, these shortcomings are not very serious in our case. But there is no doubt that this whole package question is one which needs serious consideration. We are still a long way from the ideal fruit package.

PRODUCTION OF NURSERY STOCK.

W. M. GOULD, NEWARK, NEW YORK.

When the New World received its colonization from the Eastern Hemisphere, the nursery business started with it and as early as 1768 a New York State man, Thomas Young, was awarded a prize of ten pounds sterling for having the largest number of apple trees (27,000), in his nursery. Western New York has been for many years a center of great nursery industries.

The growing of nursery stock, as an enterprise, has done very well, indeed, to come as near as it has to keeping pace with the enormous demands made by the home-maker,

as well as the commercial planter. While a demand for fruit-producing trees and plants has increased every year, the demand for shrubs, roses and ornamental trees has been even greater.

All owners of real estate are prospective buyers of nursery stock. The commercial planter is increasing his demands every year and the nursery business for years has been kept on the alert to take care of this demand. The fact that the nursery business has become a large industry is all the more surprising, when you consider that a man really has to be born into the business, or marry into it.

NATURE OF THE INDUSTRY.

The nursery business seems to have very little attraction for the average business man with capital, seeking investment, for the nurseryman's money is tied up from three to four years for each crop. The capital invested always depending for its return upon the chances of the elements, must battle with dry weather, wet weather, hailstorms, insects and diseases. The nurseryman has always before him the problem of procuring skilled labor, which is absolutely necessary. The nurseryman must get his seedlings from France, seeds from Italy and France and Japan, raffia for tying from Madagascar, the latter requisitioned during the war for making "grass" for camouflage. He must run the risk and meet the cost of getting these world-wide supplies. He can procure labels from only two factories in the country. His special tools required, are many times unobtainable. Then, if he finally gets a crop, when he is ready to place it on the market, he may find that he has "guessed wrong" as to varieties required by his customers, for he has to estimate usually three or four years in advance as to what his trade will demand.

Moreover, when his trees are ready for market, he may find that the buying public has become permeated with that perennial, everblooming, everlasting joke in the farm papers about the Elberta tree that bore a Heath Cling Peach. Only a joke, but it has caused the honest, plodding, careful nurseryman no end of undeserved material loss. This Elberta-Heath Cling, untrue to name, talk is like the mother-in-law joke. We all laugh at the mother-in-law joke, of course, year after year and while it may make the unmarried man hesitate to acquire a mother-in-law, each one of us who has a mother-in-law knows her to be a very good woman, and we agree that an injustice has been done to every mother of a married daughter by this ancient joke.

So much for the operation of planting but you ask, "What have we planted?" We have prepared the land by thorough and deep tillage for one year. We have drained or re-drained it two and one-half to three feet or more deep, plowed it in the fall, harrowed, rolled and trenched it in the spring and planted the stocks.

NURSERY STOCK.

But, what are "stocks"? A stock in an apple block may be either a seedling or a root-graft.

Root-grafts are made by taking a seedling, root-grafting it by means of tongue-grafting or whip-grafting onto it a dormant scion of the variety desired.

This root-grafting is usually done in the winter months. Root or crown-grafting was, for many years, a very general practice among nurserymen but this plan of propagation has been largely discarded, especially in the East and the method of planting seedlings has become general.

Seedlings are grown from apple seed and in normal times are imported from France in large quantities. The question is always asked—Why from France? The nurseryman answers that, by stating that the French seedling grows the best; even better than the American seedling when transplanted; it shows better foliage and takes the bud better, and produces a more vigorous tree. Recently, some very good results have been secured from American seedlings but as a rule, with us have not been satisfactory.

By the way, French or American seedlings when planted cost as much as the nurseryman used to get for his trees.

So this "stock" that we have planted is an apple seedling and we proceed to cultivate, hoe and spray until July, when the earth is levelled away by use of the grub-hoe and the budding is started.

HOW BUDDING IS DONE.

The term, budding, is used to denote a bark or skin operation as distinguished from grafting, which is a wood operation. The style of budding in general use is shield budding, so-called from the shape of the bud as it is cut from the bud stick.

The bud is cut from the bud stick, the bud stick having been cut and the leaves having been trimmed from the bud stick by the budding foreman who is the most im-

portant man in the whole nursery. The budder carries these bud sticks with him, from which the leaves have been trimmed and cuts each shield bud as he is ready to insert it in the seedling. In some nurseries, the budder ties his own buds but our budders do not tie, but generally the tying boys follow the budders.

The Tollis patent, as here shown, consists of a clamp that holds the bud in place. This clamp takes the place of tying. We used it this year and made a thorough test with good success.

A necessary precaution used is to have only one variety of apple budded at the same time. If you have ten budders and as you finish budding a variety, you have only one or two rows left in the block of that variety, all men work on the one or two rows until the variety in hand is finished. Then, all remaining bud sticks are collected and destroyed before the bud sticks of the next variety are allowed to go to the field. This occasions some loss of time and some extra labor cost but this rule is absolutely essential and a rule to which no exceptions are ever allowed; for, in this manner, no confusion occurs.

The commercial orchardist has come to select his nurseryman as he would his doctor or lawyer. He finds out the professional reputation of the nurseryman and looks into it as carefully as he would that of his doctor or his lawyer. They are all in one class for you don't know what they are giving you but you must rely on their good judgment and integrity to give you what is right.

With your permission, I am going to take up the production of fruit trees and explain many facts and methods that may seem very elementary but this plan may bring out questions for discussion and that is the aim of this talk.

Let us take up now, the production of a block of apple trees.

PREPARATION OF LAND.

Land that has been used for general farming, and that is the kind of land that is usually planted to nursery stock, needs to be deeply and thoroughly worked at least one season. The land needs to be drained and where tile drains are used, they should be placed two and one-half to three feet or more below the surface and, if tile drains were in the land when taken over by the nurseryman, these drains must be lowered and usually an increase must be made in the number of ditches, as nursery trees can, under no circumstances, stand "wet feet."

Land should be plowed in the fall, and in the spring harrowed and rolled and then the field is ready for the first operation of planting trees.

PLANTING.

Trenches are made by the trencher to receive the stocks in rows. These rows are usually three and one-half feet apart and the trees are planted from six to ten inches apart in the row. The stocks are "stuck" in the trench and then, they are "heeled in" by a horse-drawn heeler or firmer. The stocks should be well firmed.

The budding foreman now enters his budding for that variety in his field-book and stakes his block—the stake showing the variety. Then the decks are cleared for the budding of the next variety.

CUTTING THE BUD STRING.

In ten days or two weeks, the strings are cut on each bud or the clamps are taken off. Re-budding is also done later whenever it appears that a bud is not alive and no union is taking place, or if a bud has started to grow, the seedling is re-budded for, of course, this bud must remain dormant until next spring if it is to be of any use.

CULTIVATION.

Up to July and August, the budding months, the cultivation and spraying of the seedlings is very intense, as we want every particle of foliage possible. After budding, the cultivation and spraying are continued until September. We cultivate apple blocks each year anywhere from six to twelve times, according to the season, and hoeing is also done from time to time during the season, according to the condition of the land.

If cultivation is continued too late in the fall, it stimulates a late growth, which retards the ripening of the stock. The better the stock is ripened, the less danger of winter damage. Late fall cultivation is not advisable.

CUTTING OFF SEEDLINGS.

During the winter and early spring, when the weather and snow conditions will permit, the seedling is cut off just above the bud.

SECOND YEAR WORK.

The tops of the seedlings have been cut off near the bud. Spring is here and cultivation is started just as soon as possible. The crust is broken and intensive work is begun. The foliage of the seedling having been good the preceding year, the seedling has a good root system, which now throws all of its energy into the bud. Sprouting is done as soon as any seedling sprouts appear and the little bud starts to grow and as it proceeds to make its four to six foot growth, amid constant cultivation and spraying, it is allowed to "feather out" as Dr. Bailey says. When fall comes, many times a cover crop is planted before the last cultivation. You have now the one year bud or whip—a one year top and a two year root in the nursery now.

THIRD YEAR WORK.

During the winter or early spring following, these whips are headed back about three feet or whatever the heading height may be and in the spring, the cultivation and spraying starts—this time for the purpose of fattening the tree and growing its head. Cultivation and spraying are continued until fall. If any heavy sprouts or limbs start on the tree trunks during the summer, they are cut off but the leaves "the feathers" that grow out around the tree trunk are allowed to remain until late summer or fall. These "feathers" (leaves only) tend to increase the size of the trunk and to prevent the tree shooting up and making a spindling limb growth at the top.

So, now we have a two-year bud, a branched tree anywhere from four to seven feet, according to variety.

DIGGING THE TREES.

Generally speaking, you now have the finished product ready to dig.

Originally, the digging was done with large tree spades and with indifferent success. We did not always get all the roots and there was heavy loss from root splitting. Now the digging is done with a horse or power-drawn U-shaped digger that cuts some distance below the roots of the trees and loosens the soil so that the trees can be easily pulled out by hand or plowed out as the case may be and you get all the roots without splitting.

When we start cutting under the rows of trees with the digger it takes from six to sixteen horses, according

to the season and soil, this operation can proceed throughout the nursery but when the pulling process starts, then again there is a loss of time and the labor cost goes up, for only one variety can be pulled at a time and each bundle must have its three labels and be piled by itself before any more labels are released.

In other words, only one kind of bud sticks in the field at one time and only one kind of labels in the field at one time is a rule that has solved the question of confusion as to varieties.

PACKING, SHIPPING AND STORING.

After the trees are dug, they are taken to the packing cellars and are there sorted, graded and individually labelled and only one variety is labelled at a time. The other labels are locked up. Trees are shipped in bales, boxes or car lots, and packing is used around the roots in whatever manner shipped—wet straw, excelsior or moss being used. The most common form of package is the large wooden box.

Every nurseryman, who has sufficient storage room digs his trees in the fall and stores them over winter for spring delivery. The trees keep better in proper storage than in the field and reach the planter in better condition. Many trees have been injured by early frosty spring digging. Our replacements were very much reduced by storing our trees and we started to store 19 years ago this fall. We store all that we have room for every year. Usually, we do not build storage quite fast enough to keep up with our growing department.

COST OF GROWING.

The cost of growing nursery stock has been greatly increased during the last few years. Nursery stock has as much labor costs as any known commodity and labor, especially skilled labor, has increased in the last few years, at least three times—seedlings and grafts have increased seven times—horse-power cost has increased—the use of land costs has greatly increased, as this value has to be determined from its farm crop production value. Fertilizers have increased. The rates on money have not increased but the nurseryman uses very much more of it. The total cost of a nursery block, with all the items that a cost accounting system show, must be divided by the number of trees in the block in order to find the cost per tree, (the growing cost.) Here is where the nurseryman's risk is

shown clearly and where he differs from other manufacturers of commodities, for on account of his dependence upon the elements, his final count of his block may be anywhere from 25% to 60% of his planting and the wide range of difference between these figures represents the difference between a small profit or a loss of hundreds or thousands of dollars.

It is no wonder the nurseryman sleeps with one eye open looking at the weather report and well he may.

In fixing a price for a commodity, two features are presented:

First: The actual cost, plus a fair profit. Second: The bidding up of prices by the buyers, by reason of a large demand and a small supply, as is the case to a certain extent with nursery stock at present.

Some wholesale growers have, no doubt, kept the jobber building up and up, higher and higher, for the jobber this year is threatened with not having stock to sell. However, the average retail grower who sells to the consumer I believe, has figured, in fixing his price, the additional costs, plus a fair profit, and is mighty glad that the war is over and that a greatly increased demand for his product is here and he is looking not only at the present but into the future and as he looks into the future, he knows that his customers demand of him a fair price and are willing to pay the added cost of production, plus a fair profit, and I am here to state that the nurserymen as a rule, I believe, are dealing on that basis at this time. The cost of trees has not kept pace with the general rise in prices due to the war.

I am not here to discuss the marketing of nursery stock and I mention the matter of cost, only as it enters into the question of production.

It is suggested that the orchardist and the buying public become better acquainted with the source of supply of nursery stock. The nurseryman is going along doing his best every day, just as you are—doing his best to render his customers the best service possible. The interests of the orchardist and the nurseryman are so interlocked and interdependent that there should be a spirit of co-operation existing at all times between them. The orchardists or home-planters should find out more as to what they are buying and then they can better judge values.

To be sure, they may be confused with the variation in prices of trees, as there are all kinds and grades on the market each year and all kinds of men growing trees.

There is no demand for shoddy stock—fraudulent, mislabelled, unbudded or non-grafted stock, culls or stunted stock and there should be a law against the sale of such stock. We need a pure tree law. Every dollar that a nurseryman can expend in improving his product, by adding to its purity and vitality, should be cheerfully paid by the consumer. The best cannot be too good.

No crook in the nursery business or any other business should have his foibles advertised so that the consumer regards him as in the majority, when he is only an isolated renegade with no friends among his fellow nurserymen or his customers.

The commercial nurseryman, with his cost accounting system and with his thousands or perhaps hundreds of thousands of dollars invested, will not differ in his price very much from his brother nurseryman, operating on the same basis.

According to the latest census, there are in the United States, 4500 nurseries, covering 172,800 acres, representing an investment of \$52,500,000, employing 45,600 men and 2,279 women, using 14,200 animals, and there are 3,400,000,000 woody plants or trees growing in the nurseries of this country.

This large business has been developed by an increasing demand by the home-maker. Commercial planting has been encouraged and has proceeded steadily for the reason that nurserymen, with millions of dollars at stake, realize that the way to stimulate trade is by maintaining a high reputation for honest dealing by the dissemination of honest stock—the best they can grow, and true to name. The crooks have been relegated to the discard as fast as they appear.

In closing, I wish to quote from the book of M. G. Kains on Plant Propagation and Nursery Practice:

“Cultivation, fertilization, spraying, trimming, training, root pruning, method of digging and packing, age and size of tree and a dozen other factors influence price. The cost of specimens should always be reckoned on the basis of quality. Often a high-priced tree is cheap at its price, and often a low-priced tree is expensive even as a gift. The initial cost is, in most cases, a mere trifle when compared to the later value of the specimen as a producer of fruit or beauty. Far better estimate the nurseryman and his business methods than compare or contrast his prices with those of his competitors. Such factors as trueness to name, plumpness and quantity of roots, and thoroughness of packing are beyond price.”

GOVERNMENT INSPECTION OF FRUIT SHIPMENTS.

WILLIAM H. DARROW, DEPT. OF AGRICULTURE,
WASHINGTON, D. C.

I am very glad that I have this opportunity to tell the fruit-growers of my native state something about the work which the Government is doing, through the Bureau of Markets, to assist the fruit growers all over the country in the marketing of their crops. For many years most of the states, and the Federal Government as well, have done much towards increasing production, but until six years ago no governmental effort had been given to the almost equally important problem of getting the product to the consumer. With a modest appropriation of \$50,000 provided by the Agricultural Appropriation Act of March 4, 1913, the Bureau of Markets of the U. S. Department of Agriculture was established in May of that year as the first official agency in the United States to study marketing problems and to assist in their solution. Since that time the work of the Bureau of Markets has steadily grown, with the result that the regular appropriation for the current fiscal year exceeds two million dollars. During the same time the number of workers in the Bureau has grown from about a dozen to nearly two thousand.

At the present time the field covered by the Bureau of Markets is so great that the work is divided into 35 or 40 different lines of activity. These cover marketing problems concerning the scores of products raised in different parts of the country, ranging from edible fruits and vegetables to hay, cotton, and tobacco, and from eggs to livestock. Part of the work is investigational, for the purpose of determining the facts and outlining what can be done; part of it is demonstrational, for the purpose of bringing to the attention of those concerned the results of the investigational work; part of it is service work, which consists of performing needed marketing activities which the citizen cannot very well perform for himself; part of it is regulatory work, which consists of enforcing laws passed by Congress to improve the processes of distribution in behalf of the producer, the distributor, and the consumer.

The service work performed by the Bureau of Markets includes the market news services which are maintained on fruits and vegetables, live stock and meats, dairy and

poultry products, as well as on grain, hay, feeds and seeds. The market news service on fruits and vegetables maintains permanent offices at the present time in fifteen of the larger cities of the country, and reports are issued in season covering twelve to fifteen important commodities. These reports are issued daily, and give information regarding carlot shipments as well as the jobbing prices in the various markets on the day issued. Market news offices are maintained in Boston and New York, and anyone desirous of receiving these reports can be placed upon their mailing lists without charge, upon making application. Applications should be sent to the Bureau of Markets, U. S. Department of Agriculture, 204 Franklin St., New York, or 402 Atlantic Ave., Boston. The application should also state the particular product or products concerning which information is desired.

The service work of the Bureau of Markets also includes that which your worthy Secretary asked me to explain at this meeting—"The Government Inspection of Fruit Shipments." Government inspection of fruit shipments is provided for under the so-called "Food Products Inspection Service" which came into being as a result of the War Emergency legislation enacted by Congress and approved on Aug. 10, 1917, "An Act to provide further for the national security and defense by stimulating agriculture and facilitating the distribution of agricultural products." Due to the fact that the food products inspection law was inserted in the Senate at a late stage in the progress of the bill, the Department of Agriculture did not anticipate it and was unable to take preliminary steps toward organizing this service prior to the actual approval of the Act on Aug. 10, 1917.

However, inspection offices were soon opened in several of the largest cities, and new markets were added from time to time until last spring inspection offices were maintained in thirty-two of the larger cities of the country. At the present time offices are maintained in about twenty-five different cities, but these cities in turn serve about one hundred and forty others. The New York office was opened in November, 1917, and the Boston office on Dec. 13, 1917.

The objects of the Food Products Inspection Service are to facilitate the distribution and marketing of farm and orchard products, to hasten the releasing of the cars used in transporting these products, and to prevent deterioration and waste. These ends are accomplished chiefly by furnishing the shippers and handlers of fresh fruits and vegetables detailed and unprejudiced reports

on the condition of shipments, particularly on those over which disputes arise. The official inspection certificates issued by the various inspectors are legal evidence with regard to the quality and condition of the products inspected, and are consequently used as a basis for the settlement of disputes between the shipper and the receiver, and also in reference to loss and damage claims against the railroads. The old evils of unfair rejection of shipments, false grading, unjust claims of damage by reason of weather or otherwise—all such abuses may be reduced by the present system of official inspection.

The language of the present appropriation bill (Public No. 22, 66th Congress) reads:

“For enabling the Secretary of Agriculture to investigate and certify to shippers and other interested parties the quality and condition of fruits, vegetables, poultry, butter, hay and other perishable farm products when received in interstate commerce at such important central markets as the Secretary of Agriculture may from time to time designate, under such rules and regulations as he may prescribe, including payment of such fees as will be reasonable and as nearly as may be to cover the cost for the service rendered: Provided, That certificates issued by the authorized agents of the department shall be received in all courts of the United States as *prima facie* evidence of the truth of the statements therein contained.”

The original inspection law of 1917 read, “For enabling the Secretary of Agriculture to investigate and certify to *shippers* the *condition as to soundness* of fruits, vegetables, and other food products,” etc. In other words, the 1917 law allowed inspections to be made only upon application of the shipper, and only “condition as to soundness” of the product. The Agricultural Appropriation bills of 1918 and 1919, however, extended the scope of the service so that inspections can be made not only at the request of the shipper, but at the request of any party having a financial interest in the shipment, including the shipper, the receiver, or the carrier, or any authorized person in behalf of such applicant. Furthermore, certificates can be issued as to quality and grade, as well as to condition of soundness. Thus under the present law, anyone having a financial interest in for example, a car of apples shipped from any section of the country to a designated market, may make the application for inspection. This may be

the shipper, the broker, the receiver, or the railroad company. The application may be made by telegraph, by letter, or orally by telephone, but if made by telephone must be later confirmed in writing.

The application for inspection should state (1) the name and address of the applicant; (2) the names and post-office addresses of the shipper and the receiver; (3) the date of the shipment and the date of arrival, if known; (4) the kind and quantity of food products involved; (5) the identification of the food products, such as car initials and number, grade, brand, or other marks; (6) the purpose for which and the particular quality or condition concerning which inspection is requested.

In our work we make inspections of all fresh fruits and vegetables. The inspection of butter has also been started in several of the largest markets and other farm products may be included from time to time. We do not attempt to inspect all shipments of fruits and vegetables arriving in a given market, but simply hold ourselves in readiness to inspect a given carlot or other shipment when formally requested to do so by one of the interested parties. When such a request is made, the inspector makes a careful and thorough examination of the shipment and reports the facts as he finds them on a formal certificate. If the applicant is a distant shipper and wants the information at once, a wire is sent at his expense as soon as the inspection is completed and the certificate is mailed later.

The report covers so far as possible all the points regarding a shipment which would have a bearing on its commercial value or on the fixing of the blame if that value has been impaired. However, our aim is to confine our reports to facts and to avoid all statements which are purely expressions of opinion. For example, if decay is found, the extent of it is reported and also the particular type of decay if the inspector is able to identify it beyond a reasonable doubt. The type of decay or disease is, we feel, a question of fact and so should be reported. While we make no attempt to fix the responsibility for such a condition or to express on the certificate any opinion on this point, there are, however, three classes of diseases according to origin which are quite clearly recognized by pathologists, (1) field diseases, (2) diseases which may be either field or market, and (3) market diseases.

The field diseases are those which are produced in the field by parasitic fungi, such as apple rust, apple scab, apple blotch, peach scab, potato scab, etc.

The second class of diseases, those which may be either field diseases or market diseases, are produced by fungi which can be either parasitic or saprophytic. To this class belong black rot of apple, brown rot of peach, stem-end rot of citrus fruits, etc.

The third class of diseases, those which occur in the market, are produced by saprophytic fungi. Black mold or rhizopus rot of fruits, gray mold, and blue mold are placed in this class. Perhaps the most common decay of apples which we find upon the market is the so-called soft rot caused by the common blue mold fungus, technically known as *Penicillium expansum*.

In practice the inspection service has proved to have both a direct and an indirect value. In times past a great many rejections have been made by unscrupulous dealers, particularly when market conditions proved to be unfavorable at the time of the arrival of the car. On the other hand, a great many shipments of fruits and other perishable products arrive upon the markets in very poor condition, some of them being practically worthless, on account of decay and other causes. The purpose of the inspection service is to furnish a prompt and complete report of the exact condition of the shipment in order to speed up the handling of it, to release the car promptly for further use, and to furnish a basis on which the shipper and receiver can make adjustments. An accurate report of this kind is of great advantage to the shipper, especially if he is several hundred or several thousand miles away and if he has reason to suspect that the shipment arrived in better condition than was reported by the receiver.

As you all know, there used to be many rejections on a falling market. Some operators made a practice of ordering many cars promiscuously depending on a rise in prices before the arrival of the cars to give them a profit. If, on the other hand, the market went down, it was an easy matter for them to find some fault with the car, perhaps entirely technical, and so reject it. These men are now finding it much harder to do that sort of thing, at least for any length of time, and they are finding it almost impossible to reject cars unless there is some real reason for such action.

The inspection work is of value to shippers also in calling attention to improper methods of loading or to poor grading of the product. Cars are inspected almost daily in some of the larger markets in which improper methods of loading or bracing have resulted in a considerable number of broken packages or in heating or freezing of the

product. Poorly graded stock is still more common. The inspection certificate usually shows this condition but some of the inspectors have written shippers especially to call their attention to the condition in which their products are arriving on the market and to suggest needed improvements in methods of packing, handling, and disease control.

The shippers are not the only ones that are benefited by the inspection service. The receivers were quick to realize its benefits and to demand that the privilege of making applications for inspections be extended to them. As a class, they were very ready to welcome any organization which would protect them from the unfair competition of dishonest dealers, with its accompanying slashing of prices and demoralization of the market. They naturally are not disposed to accept losses for which someone else is responsible, as is frequently the case. The tremendous amount of worthless or badly injured fruits and vegetables arriving in the large markets of the country is constantly a surprise to those who visit the produce districts from time to time. In many cases, then, the receiver is absolutely justified in reporting a very heavy percentage of decay. However, unless he is well known to the shipper there is always the chance that the latter may be somewhat skeptical about the truth of such statements. If these statements are true our inspection reports confirm the word of the receiver and protect his reputation against unjustified criticism. Shippers and receivers can consequently get together in making proper adjustments and can devote their time to devising means to prevent a recurrence of such losses, instead of spending it in mutual accusations.

Besides these direct advantages resulting from the use of the inspection service, there is an indirect but very substantial effect of the service on the trade generally. The fact that such an inspection service is available, reduces the temptation to reject shipments on trivial or fictitious grounds and so places the whole produce business on a more stable basis. Also it brings about more careful trading between shippers and dealers. Conditions of sale are stated with greater clearness and precision and are in more and more cases being put down in writing. Thus the buyer and the seller are more nearly in agreement on their contracts and the chances for misunderstanding or misinterpretations are reduced. The growers also are shown the results of packing and shipping under grade or infected stock, and realizing that their products are subject to inspection on arrival,

they are led to practice greater care in spraying and in grading and packing them for the market.

I have here several sample certificates, and I hope that it will be possible to have a copy of one of them printed in the Annual Report of the Vermont Horticultural Society.

Here is one covering an inspection of onions made upon application by wire from a shipper in San Francisco, Cal. The onions were rejected by the receiver in Worcester, Mass. The shipper was sent a wire the same afternoon the inspection was made, stating the condition in which the inspector found them.

Here is one covering an inspection of a car of potatoes in Providence, R. I. The receiver rejected the car and the shipper in Maine wired for inspection.

Here is a certificate covering a car of apples shipped from Virginia. This was one of a shipment of five cars intended for export and inspected in Boston at the request of an exporter in New York City.

Here is another showing the condition of a car of peaches inspected in Springfield, Mass. This car was one of three inspected on the same day at the request of a large shipper in Georgia. A wire to the shipper sent him in the evening gave him the percentage of decay found in each layer in each car. The shipper was then equally as well posted as the receiver concerning the condition in which his goods arrived at their destination.

Here is one showing the condition of a car of boxed apples from the State of Washington inspected in New Bedford at the request of a broker in Boston.

We have received wires at the Boston office within a few hours of each other from both shipper and receiver requesting inspection on the same cars of products.

Under the inspection law inspections can be made only at such important central markets as the Secretary of Agriculture may from time to time designate. The markets in New England which have been designated include Bridgeport, Hartford, New Haven, Norwalk, Stamford, and Waterbury in Connecticut, which are covered from the New York office. Those covered from the Boston office are as follows: The Metropolitan District of Boston, including about forty-five towns and cities in the vicinity of Boston, bounded approximately by a curved line drawn through Salem, Framingham, and Weymouth; the cities of Haverhill, Fall River, Lawrence, Lowell, Brockton, New Bedford, Springfield, and Worcester, in Massachusetts; the

city of Providence in Rhode Island, Portland in Maine, and Concord and Manchester in New Hampshire.

The greater part of the inspections from the Boston office are made in Boston and in Providence, although usually several inspections each month are made in the cities of Fall River, New Bedford, and Worcester. Only occasionally are requests for inspection in the remaining designated markets received. A summary of the inspections made in all the designated markets of the country for the year ending last March 31st, showed potatoes in the lead, with about 5,500 inspections; apples came second with over 1,500 inspections; while onions and cabbage followed closely with about 1,000 inspections each. A considerable number of cars of grapes, peaches, tomatoes, watermelons, pears, oranges, grapefruit, cantaloupes, sweet potatoes, lettuce and celery were inspected, while occasional inspections were made covering many other of the fruits and vegetables. The large number of potato inspections made is due partly to the fact that potatoes are on the market twelve months of the year, while many of the other products come and go with the seasons. Our records in Boston show that during the month of July, 1919, eighty-six cars of peaches were inspected against thirty cars of potatoes. On the other hand, during October, 1919, not a single inspection of peaches was made, while fifty-nine cars of potatoes were inspected.

The inspection law provides for the "payment of such fees as will be reasonable and as nearly as may be to cover the cost of the service rendered." The fee charged is \$2.50 for a shipment of half a carload or more up to a full carload, and \$1.50 for a shipment of less than one-half a carload. Payment of the fee is required by check or by post-office or express money order, payable to the "Disbursing Clerk, U. S. Department of Agriculture." If the inspection is made at a market other than the inspector's headquarters, the applicant is required (in addition to the above fee) to reimburse the inspector for actual expenses incurred in making the inspection, such as railroad fare, subsistence, etc. A separate check, payable to the inspector personally, must be made out for these expenses. Directions for returning the fees are printed on all fee slips and mailed to the applicant with the original copy of the certificate. The person or party who requests the inspection receives the original certificate and pays the fee or fees, although a carbon copy of the certificate is also sent to each other party known to be interested. It may be well to remember this last point in case a receiver tries to

bluff, as has been done, by declaring that the goods are in bad condition and that his statement is supported by Government inspection. If you are the shipper you will know, if you have not received a copy of the inspection certificate, that no inspection has been made by us.

The Food Products Inspection law provides that the certificates issued by the authorized agents of the U. S. Department of Agriculture shall be received in all United States courts as prima facie evidence of the truth of the statements therein contained. The term "prima facie evidence," as thus used, means such evidence as will be sufficient for the proof of a particular fact until contradicted and overcome by other evidence. The inspector has no authority to do anything more than to issue a certificate on the condition of the shipment at the time of inspection. He cannot say what disposition shall be made of such shipment. He cannot act as a mediator in settling disputes or in making adjustments. The purpose of this inspection work is simply to provide a means of securing an accurate report from an impartial and unbiased inspector in order to form some basis on which the parties interested can settle their differences and with fairness to both sides. If you are a shipper and someone rejects your goods without just cause, or if you are a receiver and the shipper does not send the grade of goods you bought, the Government provides you, through this inspection service, with a means of securing a report on the exact condition of the shipment, so that an adjustment can be quickly reached.

I append herewith lists of designated markets for inspection; also inspection service sheets of information.

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF MARKETS.

Government Inspection of Fruits and Vegetables.

The Food Products Inspection Service is now available in the markets named below. Inspection offices are established only in those cities whose names are printed in heavy type; if an inspection is desired in one of the smaller cities in the list, communicate with the inspection office under which that particular market is listed. The small towns immediately adjacent to the larger cities like New York or Boston are considered as included in those markets.

Applications for inspections should be addressed by mail, telegraph, or telephone to the Food Products Inspector at the address given.

DESIGNATED INSPECTION MARKETS.

BOSTON.	PHILADELPHIA.	PITTSBURGH.
402 Atlantic Ave. Haverhill. Fall River. Lawrence. Lowell. Brockton. New Bedford. Springfield. Worcester. Providence, R. I. Portland, Me. Concord, N. H. Manchester, N. H.	308 Bourse Bldg. Allentown. Harrisburg. Lancaster. Reading. Scranton. Wilkes-Barre. Trenton, N. J. Wilmington, Del.	303 Kellerman Bldg. Altoona. Wheeling, W. Va. Youngstown, Ohio.
NEW YORK.	BALTIMORE.	CLEVELAND.
204 Franklin St. Albany. White Plains. Bridgeport, Conn. Hartford, Conn. New Haven, Conn. Norwalk, Conn. Stamford, Conn. Waterbury, Conn.	411 Customhouse. Hagerstown. York, Pa.	503 Erie Bldg. Akron. Canton. Lorain.
ATLANTA.	WASHINGTON, D. C.	COLUMBUS.
405 Connally Bldg. Augusta. Macon. Chattanooga, Tenn. Birmingham, Ala. Montgomery, Ala.	U. S. Bureau of Markets. Alexandria, Va. Richmond, Va. Norfolk, Va.	303 Martlin Bldg. Lima. Newark. Springfield. Zanesville. Huntington, W. Va.
ATLANTA.	JACKSONVILLE.	CINCINNATI.
405 Connally Bldg. Augusta. Macon. Chattanooga, Tenn. Birmingham, Ala. Montgomery, Ala.	911 Bisbee Bldg. Tampa. Savannah, Ga.	209 Johnston Bldg. Dayton. Lexington, Ky. Louisville, Ky.
ATLANTA.	BUFFALO.	MEMPHIS.
405 Connally Bldg. Augusta. Macon. Chattanooga, Tenn. Birmingham, Ala. Montgomery, Ala.	232 Post-Office Bldg. Rochester. Niagara Falls. Erie, Pa.	404 Exchange Bldg. Little Rock, Ark.

INDIANAPOLIS.	NEW ORLEANS.	HOUSTON.
1102-3 City Trust Bldg.	314 Metropolitan Bank Bldg.	925 Southern Pacific Bldg.
Anderson. Evansville. Fort Wayne. Kokomo. La Fayette. Logansport. Muncie. Richmond. Terre Haute.	Baton Rouge. Mobile, Ala.	Galveston. Beaumont. Austin. San Antonio.
DETROIT.	FORT WORTH.	KANSAS CITY.
314 Hammond Bldg.	505 Moore Bldg.	212-13 Railway Exchange Bldg.
Bay City. Flint. Grand Rapids. Jackson. Lansing. Port Huron. Saginaw. Toledo, Ohio.	Dallas. Dennison. Sherman. Waco. Wichita Falls. Shreveport, La.	Joplin. Springfield. St. Joseph. Kansas City, Kans. Atchison, Kans. Leavenworth, Kans. Topeka, Kans. Wichita, Kans.
MINNEAPOLIS.	ST. LOUIS.	MILWAUKEE.
302-3 Market State Bank Bldg.	413 Old Customhouse. Jefferson City. East St. Louis, Ill. Springfield, Ill.	314 Federal Bldg.
Duluth. Superior, Wis.	CHICAGO.	Green Bay. Kenosha. Madison. Oshkosh. Racine. Sheboygan.
DES MOINES.	139 North Clark St. Aurora. Danville. Elgin. Joliet. Moline. Peoria. Rockford. Rock Island. Waukegan. Davenport, Iowa. Dubuque, Iowa. South Bend, Ind. Battle Creek, Mich. Kalamazoo, Mich.	OMAHA.
215 U. S. Courthouse.	DENVER.	436 Keeline Bldg. Lincoln. Council Bluffs, Iowa. Sioux City, Iowa.
Cedar Rapids. Marshalltown. Ottumwa. Waterloo.	308 Customhouse. Colorado Springs. Pueblo. Cheyenne, Wyo.	PORTLAND, OREG.
		410 Oregon Bldg.
		SAN FRANCISCO.
		510 Battery St.
		LOS ANGELES.
		204 Wholesale Terminal Office Bldg.

I append herewith lists of designated markets for inspection; also inspection service sheets of information.

FOOD PRODUCTS INSPECTION SERVICE**BUREAU OF MARKETS.****UNITED STATES DEPARTMENT OF AGRICULTURE.****SHIPPERS AND HANDLERS OF FRUITS AND VEGETABLES:**

The Federal Bureau of Markets, among its other activities, maintains for your benefit an inspection service in most of the larger cities of the country. Inspection offices are established in some 30 of the largest cities, as shown on the other side of this card, and from these offices inspections are made in about 140 additional cities.

This service is open to shippers, receivers, railroads, or any other interested parties. In case of dispute over a shipment, you can call on the inspector for the market in which the car is located, and he will make a thorough examination and issue you a certificate, setting forth all the facts regarding the quality and condition of the goods. It is provided in the law that this certificate will be received as prima facie evidence in all United States courts.

This inspection service is purely a service and is in no sense a regulatory or police organization. The inspector will examine a shipment and make a report upon it only when requested to do so by someone having a financial interest in the transaction, and he has no authority to do anything more than to issue a certificate to you on the condition of the shipment at the time of inspection. He is not in any way authorized to say what disposition shall be made of such shipment or to act as a mediator in settling disputes or making adjustments. The purpose of this inspection work is simply to provide a means of securing an accurate report from an impartial and unbiased inspector, in order to afford some basis on which the disputants can settle their differences promptly and with fairness to both sides.

If you ship goods which someone rejects without good cause, or if you purchase goods and the shipper does not send the grade of stuff you bought, the Government provides you, through this inspection service, with the means of securing a report on the exact condition of the shipment. Requests for inspections may be made by wire or letter. Such request should state the kind of product, the car number, the name of the receiver and the delivering carrier, and the particular point concerning which inspection is desired, if any.

A small fee is charged for each inspection. This fee is \$2.50 for any quantity from half a carload up to a full carload and \$1.50 for any quantity less than half an ordinary carload. For inspections made in the smaller markets the applicant is charged with the actual expenses incurred by the inspector in making the trip, these expenses being in addition to the regular inspection fee.

The law provides that inspections may be made only on such shipments as have moved in interstate commerce.

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF MARKETS.

No.

Original.

FOOD PRODUCTS INSPECTION CERTIFICATE

This certificate is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained.

MARKET, Boston, Mass. DATE.....19 A. M.
P. M.

To John Doe, ... ADDRESS, New York City,
(Applicant)

SHIPPER John Doe, ... ADDRESS, New York City,
RECEIVER Shipper, care Steamship Co.,

ADDRESS, Boston, Mass.

I certify that I am an agent of the United States Department of Agriculture, authorized to investigate and certify the quality and condition of food products under certain provisions, known as the food products inspection law, of an Act of Congress, approved July 24, 1919 (Public No. 22, 66th Congress), and the rules and regulations prescribed thereunder; that at the time and on the date stated above I inspected the following lot of food products received at the above market, an important central market designated by the Secretary of Agriculture, pursuant to said law and rules and regulations; and that the quality and condition, at said time and on said date, of such food products is that stated below:

CAR INITIALS AND NUMBER.....

KIND OF CAR:—Refrigerator.

WHERE INSPECTED:—B. & M. Yards.

CONDITION OF CAR (VENTS, PLUGS, ETC.):—Vents closed, ice plugs in, tanks 2-8 full of ice.

PRODUCTS INSPECTED AND DISTINGUISHING MARKS:—
Barreled apples of several varieties from Virginia, stencilled..... Each barrel stencilled with name of variety.

CONDITION OF LOAD AND CONTAINERS:—Loaded 1 high on end between doors and 4 high on side, in rows across car, in each end of car. Four barrels noted with heads broken and one of these with entire contents spilled on floor of car.

CONDITION OF PACK:—Mostly tight; several slack barrels noted. Corrugated pasteboards used in both ends of barrels.

TEMPERATURE OF PRODUCT:—50° F in top of barrel in space between doors.

SIZE:—*Stayman*:—2 $\frac{1}{4}$ to 3 $\frac{1}{4}$ inches in diameter, mostly 2 $\frac{1}{2}$ to 2- $\frac{3}{4}$ inches. *York Imperial*: Some barrels packed 2 $\frac{1}{2}$ to 3 inches, others 2 $\frac{1}{4}$ to 2-5-8 inches. *Delicious*: 2 $\frac{1}{4}$ to 2 $\frac{3}{4}$ inches. *Paradise*: 2 $\frac{1}{4}$ to 3 inches.

COLOR AND MATURITY:—*Stayman*: Mostly red over 1-3 to 3-4 of surface. *Paradise*: Entirely green or having slight blush. *Delicious*: From faintly blushed to red over entire surface. *York Imperial*: Mostly red over 1-4 to 2-3 of surface. *Ben Davis*: Mostly red over 1-4 to 3-4 of surface. All varieties, mostly hard—few firm.

DECAY:—Practically no decay. An occasional apple was found having a little black rot starting about calyx or about stem puncture.

OTHER BLEMISHES AND DEFECTS (*Fungous injuries, insect injuries, etc.*) Occasional apples were found having insect stings, codling moth, or sooty blotch. These total defects range from 5 to 10% of stock and in most cases are not very noticeable. The *Stayman* variety was found to be freer from defects than the other varieties.

REMARKS:—The barrels in this car should be examined carefully, especially if intended for shipment. Some barrels will need re-nailing, others filled up and re-headed; however, the larger part of them will be found in good condition. One barrel stencilled "Pippins" but marked "Delicious" with crayon was found to contain *Paradise*. Another barrel was found in which the head and hoops on the face end had not been nailed. Several broken hoops were also noted. The Boston & Maine Railroad state that the barrels in this car were transferred from D. L. & W 6,710.

WILLIAM H. DARROW,
Food Products Inspector.

PLEASE REFER TO THIS CERTIFICATE BY NUMBER
AND MARKET.



When the recently set commercial orchards reach their productive age there will be carloads in place of horseloads like those shown above.

THE AUCTION METHOD OF DISTRIBUTING PERISHABLE FOOD PRODUCTS.

C. R. TAYLOR, REPRESENTING H. HARRIS & Co., OF BOSTON.

I have been asked to give you a short talk on the advantages of the auction method of distributing perishable food products.

Efficiency is now the watchword in all lines of business, more particularly ours. Crops and population are increasing, and the problem is to increase distribution and consumption so as to market these increased crops satisfactorily. The auction method of selling fruits and vegetables is no new thing. It has been thoroughly tried out and tested for a long time. In England it has been in practice for over one hundred years. Not only do they sell their fruit in this way, but their flowers, plants, and foreign vegetables which before the war they imported into the country from Holland, Spain and Egypt. Their fruits were sent in from America, Canada, Australia, Tasmania, Italy and Spain,—and in the three largest markets of England,—Glasgow, Liverpool and London,—the auctions handle from 80% to 90% of all fruits and vegetables brought into those ports. England imports a much larger proportion of her food products than she raises.

In Boston, H. Harris & Co. started in the Auction business in 1847. The sales at that time consisted of foreign fruits from Italy, such as oranges and lemons, which were brought into the port in sailing vessels. From Spain, oranges, raisins, grapes and wine. The sales were held at the wharf where the vessel bringing in the cargo was harbored, and a cask of wine was always open for the use of the buyers. About the time we started in Boston, a fruit auction house was opened in New York and from that time the business has developed until now there is an auction house in all the large eastern cities of the United States.

Let me tell you something of the services rendered by an auction company and I will take as an example our own company in Boston. Every day we telephone our following day's sale to the Boston Fruit & Produce Exchange,—an organization of men dealing in fruit and produce,—where it is put on a large blackboard, so the buyers can see just what is coming and make their plans accordingly. The report is also printed by the Exchange on a sheet of paper, and sent around to the different firms that make up the

fruit and produce trade, so if a man does not go up to the Exchange rooms he gets his information handed to him in his office.

The next step is to make a catalogue of each car to be offered. This catalogue is made up of a number of lines, numbered consecutively, and each line gives the brand; the name of the grower, where the carload is made up of shipments from various growers; the number of boxes; and the size of the fruit in each package. The catalogue also contains the name of the shipper; the car number; the name of the shipper's agent; and whether the car is refrigerated or ventilated.

All the information for these catalogues is taken from invoices made out by the shipper at the time the car is loaded, and forwarded to the shipper's agent. This information is put into shape for the printer who issues 250 or more copies of the catalogue, which are put in a convenient place against the arrival of the car.

The next thing is to get the car in for the sale. Our manager at Charlestown gets the car numbers from the different agents or consignees, makes a written order and turns that order over to the railroad representative with instructions to have those cars set on our tracks next to our shed ready for unloading. This is done about 8.00 o'clock at night and as soon as the cars are run in, the stevedores start to unload them.

They take a catalogue of the car and as fast as a man comes out of the car with a package it is put in its own particular place on the floor.

For instance, the catalogue calls for line 33—100 boxes, Quail lemons, 300 count. A man who has a box that corresponds to that brand and count is shown the particular place to put that box. The next man may have a box marked 360 count and that also has its place and so on, until the car is unloaded.

Again we take the catalogue and number up the piles of boxes to correspond with the lines on the catalogue. This is done for the convenience of the buyer, so he can examine the fruit and make a notation as to its quality and condition on his catalogue to help him in his bidding at the sale. This aids in speeding up delivery of the fruit after the sale.

As the stevedore unloads the car he sets up a box on each pile of fruit to show as a sample of that lot. This box is taken at random, and there is a sample set up for every count of each variety and mark of fruit.

At six in the morning our clerks come into the shed and take off the covers of the sample boxes and remove the

wrappers from the fruit in the lower half of the box. We do not allow the owner of the car of fruit or the shipper's agents to touch the fruit in any way, even if they show decay.

We are now ready for the buyers. These buyers are Americans, Irish, Italians, Greeks, Jews and Syrians, and are as shrewd a lot of men in their particular line as can be found anywhere. They come into the shed when the doors are opened at 7 o'clock in the morning, take the catalogue from a rack that is by the door,—one for each car remember, and go down through the shed examining each car as they come to it and putting on their catalogue their opinion of that particular car.

If, having looked at the samples shown, the buyers do not feel satisfied, they are privileged to open any number of boxes in the rear of the piles provided they put back the fruit into the box in its original condition, nail up the box and return it to its pile. Thus you see they have all the opportunity in the world to get a good idea of the pack, quality and condition of the goods we offer for sale. We make no attempt to hide or disguise anything. A fair deal to everyone is our slogan.

Just picture to yourselves what would happen if this were not our policy. We do business with these same men every day in the year except Saturdays, Sundays and holidays and how long do you think we, or anyone, could last if they did not get an absolutely square deal?

It is just as important to us that they make a success of their business as it is to them, for the more money they make the greater enthusiasm they show and the more money they will have to come back to purchase more.

Now let us suppose the buyer has finished his examination of the goods to be sold. He goes upstairs to the salesroom and takes his seat. Most of the buyers own their own seats, having paid for them according to their own ideas of good location. At nine o'clock a bell rings throughout the house and as near nine as possible the sale starts.

The buyers bid for the privilege of choosing what fruit they want out of the car, the highest bidder having the choice, and he is privileged to take a unit, in the case of citrus fruits 20 boxes, and in deciduous fruits 50 boxes, or he can take the entire line or the whole car at that price if he sees fit.

Let us turn our attention to the seller for just a moment and watch him as he sells his car and see how he is protected. He usually sits next to the auctioneer on the left. Let me describe him. He may be a salaried representative of a co-

operative marketing association; a private agent of a number of growers, working on a commission basis; or a commission man selling at auction goods that are customarily thus sold.

The Massachusetts auction laws state that one bid made by a buyer and accepted by the auctioneer need not constitute a sale. If two bids are accepted the sale must be made. BUT, it is only necessary to sell one unit. Now if a seller feels that the price offered is not enough he can limit the sale to one unit and withdraw the balance of the car,—or in case market conditions are very bad the seller may instruct the auctioneers to refuse any bid under a certain limit, and if the auctioneer cannot get that bid, or more, the sale need not be started. So you see the seller has full control over his car no matter what the situation.

As each car is sold, the price received, the buyer's name and number of boxes he bought are taken down by our men, one for delivery purposes and one for billing. The man taking sale for billing also multiplies out the car line by line as it is "knocked down", so that on completion of the sale of the car the total sales are added up and given to the seller, who is thus enabled to know the total amount his car brought before leaving the auction stand. This helps him for he goes over to his office as soon as his car is sold, wires his principals and before the day is ended the grower knows just what his goods brought, the state of the market and the possibilities for its advancement or otherwise.

The man taking sale for delivery sends his book downstairs as soon as the car is sold, the delivery clerk taking the book and marking up the goods with the buyers' names. The teamsters then start in and haul the fruit over to the stores of the buyers and this continues until the shed closes at 5 o'clock, when all the fruit is supposed to be delivered.

One great essential in marketing fruits and vegetables is promptness in the delivery to the buyer, and this promptness is most essential where large quantities are handled.

We can sell a car of fruit in from 3 to 6 minutes, depending upon the activity of the market. The number of cars sold per day has ranged from 10 to 72 cars, the latter number being our heaviest day for this past season.

Now about the buyers,—we have a daily attendance at our sales of from 100 to 250 buyers, depending on the quantity of fruit offered and the season of the year. They represent jobbers, commission men and retailers in Boston, brokers representing jobbers and retailers in Canada, the provinces, and distant New England cities, such as Bangor or Portland, jobbers who come in every day from nearby

cities and towns such as Lawrence, Lowell, Haverhill, Manchester, Brockton and Worcester, buyers representing chain stores such as Ginter or Connor or Cobb, Bates & Yerxa or the A. & P. Stores, (706 stores in New England) large peddlers and lastly, the push cart men.

Lest you be surprised at the mention of the push cart men as a channel of distribution, let me tell you it is a very important factor in distributing goods, particularly in the summer time where a lot of fruit comes in that must be put into consumption immediately or where a glut occurs in the market. At such times it plays a big part and while perhaps not apparent to every one, its combined capacity for getting rid of stuff is enormous.

So you see we have a buyer for every kind and condition of fruit that is sent in, from the extra fancy, well packed, fine conditioned fruit to the goods that must be put into consumption immediately.

Combinations of buyers to limit bidding are impossible for there are too many racial differences and too many varying interests involved. We have also made combinations impossible by forbidding any buyer to bid for another who is present at the sales.

One of the most important features of the auction is that it works out in the open, so to speak, for nothing is or can be concealed. A shipper or grower can take our price catalogues which are the catalogues used at the auction with the prices realized printed against every line and see for himself all the details of how his shipment sold.

An auction sale is a public sale in every sense of the word. Another important feature is the concentration of goods to be sold and the buyers for such goods at the same place at the same time. The buyers arrive in time to inspect the goods that are on show, and each buyer, whether he be large or small, wholesale or retailer, chain store, or push cart man, finds the lots and grades that he must have to supply his customers. When the sale starts the man who wants 500 boxes of fruit is in direct, active competition with the little fellow who only wants 50 boxes. And each man, no matter how big or how little, has to be alert all the time in order to get what he wants. For we sell quickly in the auction. Speed in selling is not confusing to the buyer, as you might suppose, but instead, helps materially in keeping up the enthusiasm and centers the buyer's attention on the car on role. The buyer has got to pay attention to what is going on or he is hopelessly lost,—and as it most always means money to him he pays the strictest attention.

Each man knows what his competitors are paying, because the sales are public. And the concentration of goods and buyers saves the buyer's time, and nothing in this world is more true than the old saw that "time is money", from which the grower or shipper benefits.

A minute ago I spoke of a glutted market. There is no medium of distribution that can so quickly relieve congestion as the Auction. Just as soon as the market drops, the peddlers and push cart men buy heavily, the goods get into consumption quickly, the glut is relieved, prices go up, and the market becomes normal again.

If any of you are contemplating the growing of fruits or vegetables for a life business, let me tell you something that we have learned and seen worked out during the course of our wide experience. It is this.

Pack your goods, fairly and honestly, and grade them carefully. I want you to grasp that fact, for it is the difference between failure and success. The market today demands only two or three things of the producer. One of the most important is that the grading of the product be such that it can be depended on, whether the grades be extra fancy, fancy, or choice. The time has gone by when a producer could pack a box of oranges, and top it off with thin-skinned, heavy, fine-looking fruit, and the the rest of the box of something quite different. That method of doing business has gone into the discard.

The second thing is packing. The government has standardized the packages that are used for most of the goods now handled at auction, which of course helps the producer. He can, however, by putting extra care into his pack materially improve the looks of his goods. And nothing will sell his products any easier than to have a neat, well packed package.

The auction buyer is very quick to realize when a man is grading and packing his fruit carefully, for he has been especially trained along those lines. He has fruit offered to him every day from various parts of the world, and his keen judgment quickly picks out the best in grading and packing, and for those he promptly pays a premium.

So again I say to you,—pack fairly and honestly, and grade carefully, for by so doing you will receive enough more money for your goods to more than make up to you for the extra care and time spent. It is very easy for anyone to understand that if two cars come to auction, both alike in quality and condition, the one to get the high price would be the car that showed extra attention given to the grading and packing. There is another important phase to the same

idea, and that is the establishing of your brand of fruit or vegetables through this same medium of grade and pack. This you have seen worked out by the California Fruit Growers Exchange whose page advertisements in the Saturday Evening Post, the Ladies Home Journal, and sometimes the Metropolitan Dailies, have created a demand for "Sunkist" oranges and lemons that has helped wonderfully in disposing of those crops. But please bear in mind that all their advertising would not have helped if they had not their advertising would not have helped if they had not delivered the goods. And the principle they worked on was this same grading and packing. Now when any buyer sees any of the "Sunkist" products he knows that he can depend on that brand being the same grade from the top of the box to the bottom, that every care has been given to the pack. Consequently, when he sells to his customers he pushes the brands he himself has confidence in. Just by way of illustrating what I have just said, let me tell you that this same California Fruit Growers Exchange which started some twenty years ago, and is a co-operative, non-profit association, composed of orange and lemon growers of California, and which controlled when they started about 25% of the citrus output of that state, has grown until today they control 70% of the crop and this year's estimate is 60,000 cars of oranges and lemons. The other 30% is controlled by smaller organizations based on similar or slightly different ideas, large independent shippers and speculators. All use the auction in the large cities. But it makes no difference whether a shipper be large or influential, or whether his offering is small, his fruit sells absolutely on its merits. It is not the shipper or grower the buyer has in mind when he bids, but the quality and condition of the goods.

I have talked mostly about fruit so far without telling you the different kinds we sell, and it may be of interest to you to hear a little something of the different varieties and where they come from. In the winter and spring we sell oranges, lemons and grapefruit from California, Florida, Jamaica, the Isle of Pines and Cuba; apples and pears from the Northwest; lemons from the Mediterranean; and grapes from Spain. In the summer and fall we have cherries, plums, apricots, pears, peaches, fresh figs, grapes, persimmons and pomegranates from California and the Northwest.

We handle in Boston each year about 7,000 cars of these different kinds of fruit from California and the Northwest, not counting the lemons and grapes from Italy and Spain. The volume of business done with these countries the last three years has not been as great as formerly, due

to war conditions and the difficulty of getting space in ships, but at that, the volume is quite respectable, for we receive in the United States something like 600,000 barrels of grapes and two million boxes of lemons each year. Both of these commodities are handled exclusively at auction.

The possibilities for the extension of the auction to other lines of fruits and vegetables are large. The volume of certain lines has grown to such proportions that it will soon become necessary for the growers to use the auction system of selling.

There is a point at which the system of private sale breaks down, simply because the machinery of the system is not adequate. That point is reached where the distribution has not sufficiently kept up with the production. Where the production of a particular fruit or vegetable is large, there must be a concentration at one place of both the commodity and the buyer,—a minimum number of movements,—the minimum of expense, and speed in delivery. Where there is such concentration, and the commodity is standardized, there is no question but what the auction system is the most efficient method of disposing of the product.

The auction is no new experiment. The fact that fruits and vegetables are sold in this manner in the large foreign markets and at home, shows that it can be done, and done successfully.

It has been said that selling at auction was all right for such perishable goods as pears, plums, and certain varieties of grapes,—but was not adapted to such long keeping commodities as boxed or barrelled apples. As a matter of fact the auction system was started in selling long keeping fruits, such as lemons, foreign oranges, and Spanish grapes, and millions of barrels and boxes of apples are annually shipped from the United States to England where they are sold at auction. California has successfully sold her peaches, also, in this manner for a number of years. High class winter pears such as Comice, Winter Nellis, and Easter Buerre, sold at auction in the months of September and October, are put in storage at the expense of the buyer, and are held until the month of April, sometimes later, before going into consumption.

The question of the perishability, or lack of it, of any commodity, has no bearing on the question whether it can, or cannot, be sold at auction. The only question in selling any fruit or vegetable at auction is, whether it is an advantage to do so or not. We believe it is.

The points to remember in trying the auction method of distribution, is to have enough of the goods to insure a

regular supply for a reasonable length of time so the buyer may be attracted, and to have the goods well packed and well graded, AND NOT, as has been done, an occasional car of goods that has passed the limit of desirability.

WAYS OF USING SURPLUS FRUITS.

DEMONSTRATION LECTURE BY BERTHA A. HOLDEN,
SPECIALIST, VERMONT AGRICULTURAL EXTENSION SERVICE, BURLINGTON.

The use of surplus and second grade fruits has not yet been developed to the greatest possible extent in Vermont. There are many fruits and berries, both wild and cultivated, that go to waste each year in this thrifty state, according to reports. If this is the true situation, the surplus ought to be converted into delicious and appetizing products for the home or for commercial purposes.

The value of fruits in the diet is not always appreciated to such an extent that it is served at least once a day in every household. While the protein in fruit is of small importance, it contains other substances which are necessary in the human system. Vegetables, especially the fresh, succulent vegetables, provide the body with the same kind of substances. The mineral salts help to counteract undesirable acids which are produced in the body by meats and starches. This is one good reason for serving potato with meat. When rice is substituted for potato, the body still needs the mineral salts; other vegetables or fruits should be served. In proportion to their cost, fruits and vegetables furnish more iron than meats or fish, and iron is one of the most important mineral salts.

Fruits and vegetables furnish a large amount of cellulose, a woody, indigestible fiber, which gives the necessary bulk to the diet. During the winter months when fruits are more expensive, it is very easy to neglect this necessary bulk and the diet becomes too heavy and concentrated.

Were it not for the large amount of water found in fruits and vegetables, the body would often suffer intensely for the lack of it. There is a grain of truth in the old saying that "An apple a day keeps the doctor away".

The pleasing flavors of fruits also make them a desirable feature of the daily menu. Fresh fruits or those preserved with little or without any sugar may be eaten freely

with good results in health. If the fruits are preserved with a large amount of sugar, the fruit should be used sparingly in the diet like all of our concentrated sugar foods. The sugar present in the fruit itself is more than we sometimes realize.

Fruits and berries may be preserved in a variety of ways for future use. They may be canned with or without sugar; they may be converted into jam, marmalade, conserve, or butter; they may be dried; or the juice may be extracted and used for jellies, etc. The size, shape, flavor, and ripeness of the fruit ought to be the determining factors when deciding how fruit is to be utilized. Well shaped fruits of uniform size and ripe enough to have a good flavor may be canned without sugar. Underripe fruits are best for jellies. When the fruit is imperfect and cannot be graded, jam, marmalades, conserves or butters are the better methods. The small fruits or berries should usually be made into jam; which fruits with a large amount of pulp like apples or plums may be used for butters.

A canned fruit that has a fresh flavor and of value as a fruit rather than for the sugar may be obtained by the following method; pack the prepared fruit or berries in the jar and fill jar with a thin sugar syrup. Place rubber and cover on the jar, partially seal and process in a hot water bath outfit for 16 minutes or longer for large, hard fruits. Remove jar and seal it.

If this same method of sterilization is followed, after the fruits have been cooked, variety may be added. For example, apple sauce may be strained and canned for use in the late spring. The seeds may be removed from grapes by cooking the pulp separately, sifting, adding skins and sugar and cooking it again. This grape sauce may be sterilized in the jar, and it is then ready for future use. Pears may be baked until tender, packed in jars and processed for 30 minutes.

Any variety in the preparation of food—even of canned fruits—makes the house-keeper's problems in menu-making much simpler.

When there is a scarcity of sugar, fruits may be canned by using boiling water instead of the syrup in the above method and processing for a longer period of time,—at least one-half hour. These products are good for pies; while pears are especially good for salads, if the fruit is served for "sauce" the best way to add sugar is to make a syrup, heat to the boiling point, and cool before serving. Some fruits, like strawberries and cherries, canned without sugar do not

retain the deep, rich color as well as when canned with a syrup.

Another method, and a very satisfactory one, too, for disposing of some fruits, such as apples, crab-apples, grapes and currants, when there is a shortage of sugar is to extract the juice. As for jelly-making, the hot juice may be placed in hot, sterilized jars, partially sealed, and processed for 40 minutes at 165° F. or below boiling point. If the juice is placed in sterilized bottles a cotton stopper may be pressed into the neck of each bottle and processed for 40 minutes at 165° F. in a hot water bath immersing just below the top of the bottles. Immediately upon removing, a cork may be pressed in the top over the cotton stopper. When cool, melted wax or paraffin poured over the cork completely seals the liquid. This juice may be used for fruit punch, gelatin, desserts, pudding sauces and several other purposes as well as for jellies.

Fruit butters are made from the portion of fruit which has been passed through a sieve and then cooked down to the desired consistency. Ripe, but not over-ripe fruit, gives the best flavor for a fruit butter. Only a small amount of sugar is required and generally spices are used to give additional flavor. Wind-falls and early apples are excellent for apple butter, and some good sweet cider added during the cooking process improves such butter as lacks flavor.

Because of the large amount of sugar used, preserves, jams, marmalades and conserves may be stored like jellies, in uncovered containers if sealed with paraffin. These richer fruits should be used sparingly because of their high sugar content, but they have their place in the daily menu and are desirable when so used. Gooseberries, grapes, rhubarb, plums or any other kind of fruit may be utilized, and there are pleasing combinations for each one. In preserves, the fruit should be whole, plump, clear and tender, after being cooked in a heavy rich syrup. In marmalade, thin slices or small portions of the fruit may be seen suspended in the clear, smooth mixture of jelly-like consistency. Jams are made from whole small fruits, part of the fruit being ripe to give flavor while the remainder should be under ripe to give a good consistency. The fruit is crushed in the preparation of the jam. Conserves are made of small or large fruits, often a combination of fruits, and nuts or raisins are usually added.

The proportion of sugar and fruit for the richer preserved products may be varied according to the acidity of the fruit. For acid-fruits, three-fourths of a pound of sugar may be used to a pound of prepared fruit. For medi-

um sweet fruit, one-half pound of sugar is sufficient for the pound of fruit; and for very sweet fruit, one-fourth pound of sugar.

Many recipes for preserving fruits may be obtained through the Vermont Agricultural Extension Service at Burlington. There are other ways of utilizing surplus fruits than those just mentioned, but upon studying the recipes we often discover that they are simply variations of some of these principal methods. Would it not be worth while for each individual to assume more responsibility in conserving surplus fruits? Surely, any house-keeper may well be proud of a large store-room full of these delicious and appetizing products which are of so much value in the daily diet.

During the demonstration, the following were prepared: Apple and grape sauce; baked pears were canned; pears and fruit juice were canned without sugar; and canned pears were made into a salad.

After the demonstration, pear salad and various kinds of jams and marmalade on wafers were served.

A BETTER PLACE TO LIVE.

**PROFESSOR F. A. WAUGH, AMHERST, MASS. ABSTRACT
FROM ILLUSTRATED ADDRESS.**

The lecture by Capt. Frank A. Waugh of Massachusetts on "A Better Place to Live" was a plea for civic improvement in city, village and country accompanied by practical suggestions as to how such improvements can be achieved. The lecture was amply illustrated with colored lantern slides. The entrance to the community, whether by railroad or automobile, ought to be clean, dignified and attractive. Many fine examples were shown of well-designed village streets and well-built country roads. The speaker insisted that the public roads were not only great business arteries but were also the people's parks since the enormous bulk of pleasure driving now follows the country roads. The great social value of the natural scenery of the country was brought out, and the impression was left that New England is a pretty good place of residence though we should all be awake to every opportunity to make it "a better place in which to live".

THE FARM LABOR PROBLEM.

GEO. W. PERRY, CHESTER DEPOT, VT.

When we consider the relation of farm labor to-day to that of other kinds in the land, the wonder is not that it is so difficult to secure farm labor, but rather that there is any at all to be had. Let us go back and see what this relationship was 75 years ago, when all work was hand work. There were few idlers then, and all men and women worked at least thirteen hours a day. I remember well about it because my father was a shoemaker and I, as a little lad, began at eight years of age to stitch shoes by hand. There being no big factories and shops, all mechanical work was done at home or in little shops where two or three worked together. Even in Lynn, the great shoe city of the land, nearly all of the work was done outside of the little building that was all the factory there was. In this small factory the different parts of the shoe were cut out, and the parts for the uppers were sent out into the homes to be stitched together by hand. Then those uppers were returned to the factory, to be sent out to other homes to be bound, only to be returned once more to the factory and again sent out to houses or little shops to be bottomed. The same thing practically was done in all kinds of manufacturing. All of the people who worked at the different trades labored 13 to 14 hours a day, practically all of the time except when they were eating and sleeping. "Satan finds some mischief still for idle hands to do" was the motto of the times, and they accepted constant work as the natural condition of life. But the variety of their work made it interesting and much less tiresome than is the specialized labor of to-day. When they first built the great cotton and woolen mills at Lowell the employes were American men and girls, and it was the natural thing for them to work 13 or 14 hours a day, as they had been accustomed to do at home. They went into the mills in time to be at work at 5 in the morning, came out at 7, having half an hour for breakfast, going back to work and coming out at 12, with an hour for dinner, coming out at 6 for supper, and then returning to the factory, and working till 8 and sometimes till 9. But this did not seem a hardship, as all mechanics made the same long day. So the farm hand in those times had no longer a day's toil than had all of his fellow workers. He worked from daylight till

dark in the summer, coming in for meals exactly as did the factory hands, and in the winter time doing his chores in the barns by lantern light.

In that early time the farm hands were of a high class, being the sons of the neighboring farmers. There were large families of children, often five or six sons growing up, more than could be used on the one farm. So the sons went out to work in the families where the children were mostly girls, and some of the girls went over to help their neighbors who had no daughters. These farm hands were the equals socially of the people with whom they lived, and were interested in everything that went on in the family. They went to the same church, and took part in the same social affairs of the vicinity in which they lived, and there was a great deal going on socially out on the farms then, but there is almost nothing now. In the old New England days the winter sports were ushered in by the husking bees, when the red ears made the ears of the girls red and the hearts of the boys glad. These were followed by apple bees, singing schools, spelling schools, and quilting parties. "Twas from Aunt Dinah's quilting party I was seeing Nellie home", they didn't sing it in those days, but they did it, which was very much nicer.

The farm laborer's pay was not over \$10.00 a month, and often was much less. But it must be remembered that he was in one sense a boy learning a trade. Other boys learning trades in those times had only their board and clothes. Working on week days 13 or 14 hours, the boy on the farm also had the chores to do on Sunday, but that was not considered a hardship because people were allowed to do nothing on the Sabbath except to go to church, and the necessary farm work helped to fill in some of the hours of a long and tiresome day. But at that time the pay of a carpenter or a mason was only a dollar a day without board. Then all such workers lost time on rainy days, and had no work during the winter. So on the whole the farm laborer's pay was fully equal to anybody's.

Seventy-five years ago the circumstances of the farm laborer were fully as favorable as those of any other worker at the various trades. But how is it to-day? The invention of labor-saving machinery increased the production of all manufactured articles to such an extent that the day's work of almost all the mechanics of the land has been almost cut in two, as they are now working only eight hours a day instead of fourteen, Sunday has become a day of recreation, and they have the whole day in which to enjoy themselves. Not only has the day been cut in two, but the wages have

been made five or six times as great as then, so that the ordinary shop hand now gets \$5.00 for a day of 8 hours. While that has been going on in all other employments, on the farm the situation is practically the same as it was 75 years ago. On the dairy farm the men are expected to be at work by 5 o'clock or earlier, they have half an hour for breakfast, an hour for dinner and come in at 6 for supper, being fortunate if they are not worked after that time. In that respect there has been a little shortening of the day, as on most farms there is no labor expected after 6 o'clock. But that is more than made up by the lengthening of the winter day on the farm. In that olden time there was almost no milking in the winter, all but one of the cows being dried off at the beginning of that season. No milk was carried into the cities except from their immediate vicinities. All the butter and cheese, even for the farmer's families, was made in the summer. There was a great deal said about "June butter", which was supposed to be the best. Just as now all the nice looking turkeys are sold as "Vermont turkeys", no matter where they were raised, so then all good butter was sold as "June butter", no matter in what month it was made. Thus was cut off of the long day on the farm in the cold winter a very important slice. Nowadays so much milk must be shipped into the cities, and the people must have their butter fresh made, there is about as much milking in the winter as in the summer, and the hired man must be out in the dark and the cold to begin work at 5 o'clock or earlier.

With regard to the class of men who are our farm hands at the present time something must be said. While some of them are still fine young men, yet to-day the average hired man does not fit in with the family in which he lives. He sits at their table, makes his home in the house in a way, but has nothing in common with the family. The conversation is not about anything he cares about. He has no part in the social affairs in which they are interested. The books and magazines on the table are not the kind for which he cares. He is a stranger in a strange land, and it is just as uncomfortable for him as it is for them, his presence being a restraining factor in the real family life in the midst of which he finds himself placed. In a great many instances he is just a tramp who has come along looking for work. In the past ten years there have been many terrible crimes committed by such men. The farm hand finds nothing to interest him during his leisure hours, if he has any.

Wages on the farm are not so bad, as they have been increased from \$10.00 a month to at least \$50.00, and that

for very ordinary hands. It is certainly true than he can, if he will, lay up more money in a year than can the worker in the store or shop.

The Sunday work is also an important item. He is tied to the place three times a day to do the chores. The laborer in any other kind of work has the day entirely to himself, and spends it as he pleases, but the farm hand cannot have the day off; and now that it is largely a day of recreation, he would like to have it.

It is not strange that it is almost impossible to hire help on the farms, when the situation is seriously considered. The condition is a very critical one, and, unless some remedy can be found for the trouble we will all starve. This is much more difficult than describing the deplorable situation.

There are two or three things that will relieve the situation a little. First that no one on the farm shall be required to work a minute after 6 o'clock at night. Secondly, on a dairy farm, or any other where men are expected to be at work by 5 o'clock in the morning, it would be a good plan to given them two hours at noon instead of one. My men have to be out at 5.30 in the morning, have two hours at noon and quit at 6.00. They have time to take a little rest in the middle of the day when the heat is greatest, and can read or smoke or take a nap. I find this helps very much in the labor problem. As a compensation for the Sunday work would it not be a good plan to give the men once a week some afternoon or forenoon off to go where they please? Just as the employment of machines has cut down the number of hours of the day's work in the shop, so the modern farm machinery ought to cut down the length of the day on the farm. In fact almost all of the farm work can now be done in less than half the time it took when it was all hand work. The half day of course could not be any set half day of the week. But all these things would only give a little relief to the situation.

The only solution of the problem is to employ married men in place of most of the single men now employed. On the island of Grand Isle for several years provision has been made for this very thing, as nearly every large farm has a tenant house upon it besides the big farm house. There are many families in the city who would like to get back to the land, but have no money with which to buy a farm. The married man, perhaps with two or three children, can afford to work for \$50.00 a month, if house, milk, and perhaps fuel, are furnished to him free. He can raise his own potatoes and other winter vegetables as well as those for the summer.

His wife can have some hens to furnish fresh eggs and meat for his table, and she will enjoy that. Then think what a place that is for the raising of children, compared with the city tenement. It is not strange that the owners of city flats say "No children allowed", for there they are a nuisance to all the neighbors, and are in constant trouble themselves, having no place to play except the street. But out on the farm they can come into actual contact with the soil, as they can go barefooted all summer. What a saving in shoes and stockings in these H. C. L. times. I don't forget the stone bruises and cracked toes of my boyhood days, but neither do I forget wading in the brooks and running in the dewy grass. There is a great deal of truth in the story of that mythological character whose strength was increased every time he touched the ground. Then too it is a nice thing for children to grow up in close relationship to the birds and beasts of the field, to get well acquainted with cows and horses and pigs. There is a desire to keep pets born in all of us. It is surprising what numbers of living pets are kept in the city, even in the seemingly impossible city flat. Traveling actresses bother the railroad and hotel men to death with their dogs, parrots, white mice, etc. On the farms the children can have all kinds of pets. The ox is coming back to his own in Vermont. In Chester where I live in the winter I now see them every day. Wise is the man on the farm, with a boy twelve or thirteen years of age, who sets that boy to breaking a pair of calves to become by and by a pair of oxen. When those steers gee and haw in obedience to his voice, and mind the touch of his whip over their noses, he will be happier than a general who conquers a kingdom. Oh, but he can have a dog, and we don't begin to realize how much a dog means to a boy. It may be the veriest mongrel that ever was, though there is no necessity for that, but the effect of the companionship of that dog will stay with him all his life, making him more kindly and more patient, and more companionable with his fellow men. The girl can have yellow kittens to her heart's delight, and boys and girls can have rabbits and guinea pigs and all sorts of things to take care of and fondle. What is the teddy bear of the city child in comparison? Growing up thus in close relationship with all Nature, and under the blue skies by day and the starry skies by night, they become real men and women. It is almost as difficult to grow a noble man or woman in a city flat as it would be to raise a sturdy oak or a towering elm in a greenhouse. There never was a greater damage done to the farming interests than was the result of the closing up of the country schoolhouses,

and the carting of young children miles into town to become a part of a mob, with no opportunity for the development of individual character. But it had to be done, because there were no longer enough children out on the farms to make interesting schools there. But when once more children shall be growing up in large numbers out on the land, in contact too with birds and beasts and flowers, then we will have again in New England those hardy men and women, of integrity and ability, who once made this rugged country famous throughout the land. When every farmer who needs a hired man the year round shall have a tenant house for that man, and more than one where more men are employed, we may be going back to the English style, but it will be a good style if it is English. When these comfortable houses shall be overflowing with children, as they surely will, then once more the little red school house will become the boast and pride of New England.

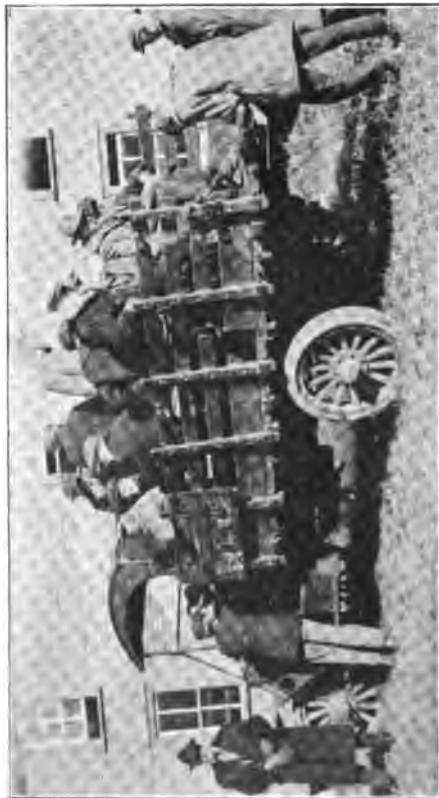
1. PROBLEMS OF THE LARGE ORCHARD.

H. A. ALBYN, BENNINGTON.

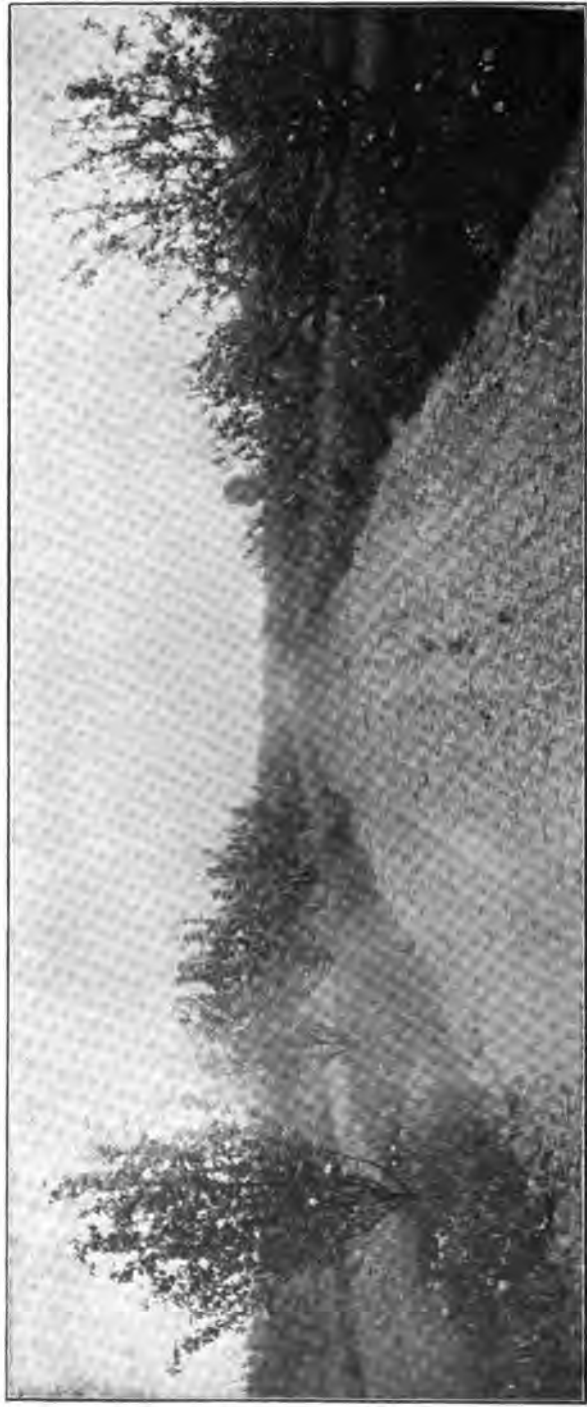
"The Orchards" is the name adopted for the Edward H. Everett estate at Bennington, Vermont. It originally consisted of five hundred acres, known as the John Griswold farm, located on the East slope of Mount Anthony, adjoining the village of Old Bennington. About two hundred and fifty acres of this farm had been kept in a high state of cultivation and was in excellent condition for growing a young orchard.

During the spring of 1911 six thousand apple, five thousand pear, four thousand plum and a few hundred quince trees were set. The apple varieties were largely, Grimes, Thompkins King, N. W. Greening, Transparent, Gano, Jonathan and a few Rome Beauty, Pewaukee and York Imperial. A large part of the Gano, all Pewaukee and York Imperial have been very successfully top grafted to Spy, Wagner and McIntosh, this top grafting seems to have made very little difference in the growth of the trees, that is the trees top grafted after the second year could scarcely be told from those not grafted.

The Grimes has proven to be one of the very best apples for this locality, being an early bearer, a strong tree and very prolific with fruit of the very highest quality. A few



The auto truck has many uses on a fruit farm. Sometimes it is employed to move men.



Northern Spy and McIntosh interplanted and showing soil treatment in a commercial orchard.

old trees of this variety on the place have born eight heavy crops in eight consecutive seasons.

The pears generally have not done well and with the exception of the Kieffers these are being replaced with apples. The plum varieties were Lombard, Gueii, Damson, and Moore's Arctic. The Moore's Arctic has proven to be a very profitable variety with the Lombard a close second. The quinces have all been dug up as the showing they made was very poor and they seemed likely to blight.

There have been from two thousand to ten thousand trees set yearly, mostly Spy, Wagner, Wealthy and McIntosh apples; also three thousand cherries. These trees are all on the East and South slope of Mount Anthony, and at present plans are being made to plant ten to fifteen thousand trees the coming spring. The N. W. Greening has been a variety very satisfactory and commands a top price as a baking apple. Where possible the ground between the trees is being cultivated with tractors and each season a heavy cover crop of sweet clover, buckwheat or rye is being plowed under, as well as hundreds of tons of stable manure and commercial fertilizer.

The latest and best types of spray machinery are being used and all trees are sprayed from three to ten times yearly, or as often as there is any need of spraying to keep the trees and fruit clean and free from insect pests and fungous diseases. A low open head type of tree is grown and both summer and winter methods of pruning are practiced. All bearing trees have the fruit thinned and all trees are protected from mice and ground hog injury with hardware cloth around the trunk.

Each tree is numbered and charted, and each orchard blue printed so that any tree can be given individual attention.

It is the earnest desire and wish of owner and manager to not only develop a large commercial orchard, but to produce fruit of the best quality. At present plans are being drawn for a storage house with a twenty thousand bushel capacity.

2. PROBLEMS OF THE LARGE ORCHARD.

R. R. MACRAE, CASTLETON, VT.

I have been requested, by our secretary, to give a ten minute talk on the problems of a large orchard; but it seems to me that I am entirely too new at the business of raising orchards in Vermont to be able to tell you of any problems which would prove of interest to most of you. I will begin with the fall of 1912, when I toured the state, north and south, east and west, studying conditions and the possibilities of a large commercial orchard.

The location of my present orchard is the result of that tour, for I became firmly convinced that Vermont offered opportunities for the raising of good quality apples such as are offered by few other sections of the United States.

For many years I raised oranges and lemons in California and at that time our greatest problem was to get any returns over and above freight charges; many car shipments to the East failing to clear freight charges, icing and commission. Later I spent two years in the wholesale fruit business in Tacoma, Washington, and became familiar with the apple belt in that section.

In the year 1908, I bought a farm near Chicago and set out two thousand apple trees, but my business did not permit of my giving much time to their development. I was not thoroughly convinced that Northern Illinois was the land of promise for my orchard, but I intended to go through with it, until that decisive trip of 1912 when I toured this State. After that I was ready to give up my business, to sell or abandon my Illinois orchard and to cast my lot and invest my all, and much more, in apple raising in this State. That same fall I returned from Iowa to attend the Horticultural Society's meeting at Middlebury, in order to get information, study varieties, etc., and the consensus of opinion seemed, at that time, to be that Northern Spy, McIntosh, and Rhode Island Greening were the correct Vermont varieties. With these I formed the basis of my planting of 12,000 trees, adding 2,000 N. W. Greening and 1,500 Staymen Winesap (which I allowed the Nurseryman to talk me into buying), and some Wealthy, Alexander and Wolf River.

After the selection of suitable land, air drained and water drained, the greatest problem for a beginner, I think, is the selection of suitable varieties, that is, to plant varieties which are hardy, commercially profitable, and

which will do best in his particular section and his particular soil. I gathered at the Middlebury meeting that the R. I. Greening was very hardy, and I planted 2,000 of them. The second winter some 1,500 of them died outright, or at least failed to show any signs of life in the Spring; the following year my team of horses and a chain put a finish to the balance, although many of them were fine specimens of trees. The Staymens Winesap also were subject to winter injury, but were much more hardy than the Rhode Island Greening. The fruit, however, did not put on a good finish nor did it get large size, so they met the same fate as the Rhode Island Greenings. I pulled them out and set hardier varieties. Since the severe winter of two years ago many orchardists have put the R. I. Greenings, Northern Spy and Baldwin on the debarred list. In some sections the Rhode Island seems to do well, but I have noticed many older orchards dying out, and I think it will be found that many of the older Greening trees have diseased wood and rotten centers. I did not plant so heavily of Northern Spy, and am glad of it, for they are not sure of themselves in our severe climate; while I have not lost a dozen trees since setting, several have suffered from crotch injury, which does not better the health or strength of the tree. Spy trees, from fifteen to fifty years, died by the thousand last year, not only in Vermont, but throughout New England and New York, and the end is not yet. I understand that Spies grafted on hardy stock went through the winter without any sign of injury, while nursery grown trees in the same orchard died out, so this may be the solution of the Spy question in Vermont. Thus I have proven to my own satisfaction, that the Rhode Island Greening is not the apple for my section, that the Staymen Winesap is an apple fit for Maryland or Virginia, but should not be planted north of the Mason and Dixon line, that the Spy is more or less of a gamble, but most of us are willing to risk devoting some space in our orchards to such a superior apple. We cannot cut out all varieties, which might be susceptible to such weather as came in the winter of 1917, and it may not happen for fifty years.

Outside the varieties mentioned, the R. I. Greenings and Staymen Winesap, my losses have been very small, less than one percent since setting in the Spring of 1913. My orchard is now composed of trees of a high degree of hardiness and of the following varieties, Duchess, Wealthy, McIntosh, Fameuse, N. W. Greenings, Northern Spy, with 300 each of Wolf River and Alexander. I have also planted a few hundred Winter Banana and Delicious, but these two

varieties are yet to be tried out. Mr. Witherell has had success with his block of Delicious planted in 1911, but outside of that planting I know of no other of either variety in bearing at the present time, unless in Mr. Bascomb's orchard at Westminster, but they are all young trees. Delicious sounds good and is a good apple, and is grown in nearly every apple state in the Union. Last Summer I toured the apple sections of Pennsylvania, Virginia and the Hudson Valley and found many large young plantings of Delicious, and the apples were large and of extremely fine color. It is a question in my mind if the Delicious plantings will not be overdone, also whether we can raise as large and well colored stock as to compete with that grown farther south, as that variety is of southern origin. McIntosh and Wealthy do especially well in our soil and location, getting good size and fine color. N. W. Greening is a good substitute for the R. I. Greening, and the tree is vigorous, while the fruit is large, clean and clear. As to the vigor of the foregoing trees, I can say that the severe winter of 1917 did not in any way harm my trees, excepting as I have stated, some crotch injury on the Spies.

A beginner should study long on what varieties to plant. He must select not only the very hardiest, fortunately some of the hardiest are the highest priced on the market and in greatest demand, but he must be careful that his varieties do not all mature at the same time. I believe that for large plantings some early apples are desirable, such as Duchess and Wealthy, increasing more on the later varieties so that by the time the early apples are picked and shipped, the picking and packing force will be well organized to take care of the Fall and Winter varieties.

When the main orchard was set in 1913, I thought it would be fine to have a home tree plot of succession of many varieties, and I planted about 30, two of each kind, selecting those which would seem to do the best in a cold climate and while I was compelled to select from reading the beautiful descriptions in the nurseryman's catalogue; you all know how that is, "A beautiful red apple, mildly sub-acid, rich in flavor, hardy, heavy annual bearer, big demand in markets, bears profitable crops in third year, etc."

When I purchased the farm there was a family orchard of some 25 trees of many varieties, Northern Spy, Wealthy, St. Lawrence, Milwaukee, Grimes Golden, Pound Sweet, Wagener, Yellow Transparent and Culvert. In 1916 I picked 101 barrels, selling them on the New York markets. As I extended my young orchard through the old planting I have been cutting out the older trees until only five remain,

one Wealthy, the crop on this tree selling for \$84.50, or nine and a half barrels at \$8.00 a barrel, not counting the "drops;" and four Northern Spies, from which I picked last year 25 barrels, and this year 28 barrels. Now had I been a more experienced grower I do not believe that I would have filled up an acre of family orchard trees composed of many varieties, but confined it to a very few trees of varieties of which the family is especially fond. It is quite a problem to pick and pack so many varieties, especially when the commercial orchard requires all your attention at that time. We look at the little four foot whip, the size trees most of us plant, and figure that two each of several varieties will not amount to much and not more than the family can use.

Now of the commercial varieties, my McIntosh brought \$12.00 a barrel this year for firsts and \$9.00 for seconds; Wealthy's \$10.00 a barrel; and the Spies from \$10.00 to \$12 dollars; while from the old family orchard the Culverts sold for \$5, the Milwaukee, \$5.50, St. Lawrence, \$6.00, etc. Why should we devote time and space to inferior low priced fruit when we can raise the quality stuff, which will command twice the figure and at the same time create a big demand for Vermont apples. In my family orchard I will have many of the \$5.00 kind; apples which I feel sure will not create any great sensation on the docks of New York, and I must send most of them to New York, for I have given up the idea of being able to eat all of them, when the trees are a little older, especially if they bear from five to ten barrels each.

We have the soil and climate to produce apples unexcelled in any part of the world, provided we stick to the varieties which we know are hardy, will develop perfect fruit and for which there is a demand in the large apple markets. The public is the judge and the apple buyers from New York and Boston are really the public's representatives. Those buyers, who visit Vermont ask for only four or five varieties, Spy, McIntosh, Greening and Fameuse, with a demand for Wealthy as an early apple, and the story is told. We raise those apples to perfection, they are apples of unsurpassed quality, and sell for the most money. Vermont can grow these just a little better than any other section of the country.

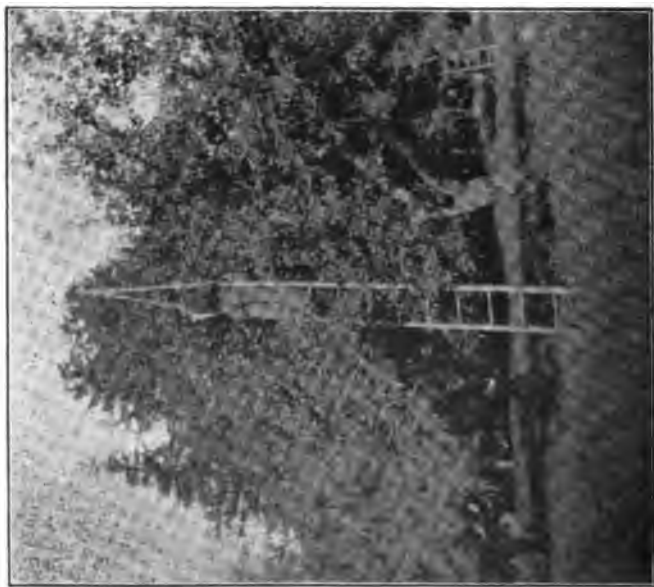
Let Virginia have her Albermarle Pippin; New York her Baldwin; California her Bellflower, but let us restrict our plantings to the few varieties whose natural home is here on the beautiful hills of Vermont.

3. PROBLEMS OF THE LARGE ORCHARD.

C. L. WITHERELL, MIDDLEBURY.

I regret that Mr. MacRae did not buy orchard land next to me so that I could get the benefit of his experiments. I am no hand to experiment, but I think that Mr. MacRae has made some very wise selections in varieties, and is carrying on some experiments that we will hear from later. One is the fertilizing of these orchards, which I understand are at the present time in sod. I believe that with the tractor some of us will resort to cultivation again. I have cut out the cultivation this last season for the reason that it was impossible to practice cultivation, and we turned the whole orchard into grass, after the spring seeding of beans, or grain, or whatever farm crop we raised, that may be necessary to get money to carry on the orchards as long as they are not producing very heavily. I believe that the tractor will come into use and we will follow the western methods of cultivation at least two years out of three.

I think one of the biggest problems we have before us, perhaps, at the present time is the spraying. We have a good many different spraying materials to select from, sold by various manufacturers, and while lime sulphur, in solution, has been used for years, and proven very successful, the manufacturers are putting out a dry lime sulphur which they claim is cheaper in some ways, and claim that 100 pounds is equal to 600 pound barrel of the solution, thereby you save, and they claim there is no waste, and that is true in one way, for there is not leakage, but I think there is waste in strength, in keeping this thoroughly mixed in the spraying tank. A few years ago I tried out this lime sulphur, and I think five years ago I was favorably impressed with it in one way, and that was that it took care of the fungus proposition, but I have determined since that, that year no one had any fungus. There was a lot of sediment in the bottom of the tanks. Last year the same manufacturer wrote me for business and said they had improved on the material, so I tried it out again and was very much disappointed, for I believe we have got to use twice the number of hundred pounds per gallon that the manufacturer indicated. I am going back to the old solution of lime sulphur in concentrated form, next year. I dare say many of you use arsenate of lead in paste form. We have discontinued it and use the powder as it keeps well and saves evaporation.



SCENES IN THE OLD AND NEW ORCHARDS.

At the left an old tree well laden with apples. Note the type of ladder in use. At the right, President C. L. Witherell inspecting Delicious trees.

Another proposition with some of us is whether to use liquid spray or the dust spray. They are using this dry mixture quite a bit in the peach orchards, and some apple orchards in southern New England. I don't recall any in the State of Vermont, but Mr. MacRae says Mr. Buxton has a power outfit. In a conversation last week with Mr. Hale, who is the son of J. H. Hale, the peach king, he said he was using a dust, and he claims, very successfully. I think that many of us should try it out, and I rather think that I will buy a dusting outfit, a larger size than the one I have, for next year's use. Mr. Hale is a man of sound judgment and I think he has tried this out thoroughly. He claims he is not able to use quite as much fancy fruit as by using the spray, but he can do it much more cheaply. He can dust a block of trees in about half the time that he can spray with the liquid. I know the expense is more for I have just a hand outfit that we turned with the crank. It does fair work, and when I bought it I got 300 pounds of the dry mixture, which I think it 85% sulphur, and I think, 15% of lead. We got fair results, but were not able to carry the experiment through because we ran out of material, and had to resort to liquid. The only way to get this dry mixture was by express, from western New York, and that made it rather expensive.

There is another subject that I might say a word about. I understand it is bothering many orchardists in the State, and that is mice.

A few of us have our trees guarded. I have every tree guarded with wire guards. The first I bought were $\frac{1}{4}$ inch mesh, 14 inches in height, and I use a piece of stove pipe wire around the center to hold the guard in place, and I leave the guard on until the tree outgrows it. The last I bought is 14 inch mesh and I think is keeping out borers to quite an extent. This guard is easily taken off when you wish to work around the tree, and this fine mesh is proving very good quality and will last several years. I think we have some on that has been on for five years and is still in good condition.

Some, who have not the guards, are troubled with borers, and this is a job that requires a lot of skillful attention. We have very few borers in our trees, and I think that two or three percent will cover our losses.

One of the big propositions is how to get our apples picked, and have them handled carefully, from the tree to the package. It is very natural for most men to pick an apple and grab hold of it as though it weighed three or four pounds, and put his thumb through the skin and make a

good sized dent. Gloves are not entirely satisfactory because they are cumbersome. We have tried gloves, by cutting the fingers and thumb off, and that makes it easy to get the apples, but when we are picking the late apples they begin to think about gloves with fingers, and they hurry on the job, and we get quite a bit of jammed fruit. Our method of picking is to use baskets and draw the fruit right to the packing house, and sort from baskets into the packages. We use a sorting table and that gives one more inspection of the fruit. We are contemplating putting in a grader, and I think by next season will have one installed. We have not yet determined what kind of grader, but there are two or three, I understand, on the market, which are proving very satisfactory. The fault of some is that they jam the fruit, or crush it altogether. There is one made in Western New York that I understand handles the fruit very easily, but when it does harm the fruit at all it will cut it right in two. Whether the Delicious can be handled in these or not, I don't know. The stem of the Delicious is a long, heavy stem, and breaks very easily and falls out, and when broken or fallen out it leaves quite a hole in the apple. Some of the other varieties, like the McIntosh, will go through very lightly without damaging the stems.

4. PROBLEMS OF LARGE ORCHARDS.

A. O. FERGUSON, BURLINGTON.

I suppose they chose me on this subject because I did have charge of the Grand Isle Orchards Company farms for eight months. In that orchard there has been set 10,000 trees. Our first setting, seven years ago, was of 3,000 trees. Of that setting 500 were Delicious, and the rest of them were largely McIntosh. The fillers were plums, cherries and pears, and a few early bearing trees. We set a few Wealthies and a few Winter Banana. Those trees are just beginning to bear. The following year we set 6,000 trees, mostly Wealthies and McIntosh. The next year we set 1,200 or 1,500, so we now have a few over 10,000 trees in that orchard. We set the trees 42 feet apart, with fillers at 21 feet.

In preparing the farm we selected what we called a good location near the Lake at Grand Isle, Vermont, within a mile and a quarter of the depot, and half a mile of the dock, so that we could boat apples to New York, if advisable



Blossoming time in the 200 acre orchard of the Grand Isle Orchard Company.

later. We removed 10 miles of rail fence on this farm and cut the brush along the fences and stone walls, and plowed the entire farm. Where we could not plow fast enough, we plowed strips six or eight feet wide and set the trees in these strips. We dynamited every place where we set the trees. We have a lime rock under our soil. We have picked up loads of stone and ground it up and spread it on the ground. We cultivate as much as we can. Up to two years ago we cultivated a very large part of the orchard, but since then we have not cultivated so much on account of the help proposition. We use Scalecide at Grand Isle for our dormant spray, and I have used it at my home for five years. We used lime sulphur and arsenate of lead for the other sprays.

We have put a great many trees where the soil is not over 10 inches deep, but we drilled down into the lime rock and dynamited, and some of our very best trees are where we had to carry dirt in planting out the trees. The tree that had the most apples on it, on the farm when we went there, did not have earth enough under it so that it could be plowed. We pruned the old trees very heavily for the first three years. Our Baldwins, two years ago, were almost entirely killed by the cold winter. Our young trees were not affected very much by the winter,—we lost perhaps 4%. When we commenced setting these trees out, we had the wire put at the foot and we have used it constantly. We think that that has saved a great many of our trees from the mice and from other injuries. At one time I purchased a lot of blotting board and cut it up into squares large enough to cover the top of those wires, folded it and cut a hole in it the size of the tree, and put a slit in it, up to the hole, and locked it around the tree in order to keep out the insects.

That year I was there we spaded around the 10,000 trees with flat fork spades twice, and there were no weeds whatever after we got through with those two spadings. To-day we are mowing two swaths on each side of the tree and leaving it on the ground, where it is in grass, but my experience has proven to me that our trees did the best in corn fields. I will venture to go anywhere on that farm to-day and put in a corn field, and you will see a bigger growth.

I was in Peru two years ago and saw eight year old trees bearing four barrels of apples. That was before they were picked. Mr. Hemingway, who was 61 years old, set out some trees that year, and I said, "You don't expect to live to eat apples off these trees?" And he said, "I shall

live to eat apples off these trees in five years," and he did. We should encourage the setting out of more trees, for it is no gamble, but don't begin too big. If you have a liking for the business and the money for it, set out more, but don't begin too heavy because it is an expense from the day you start until you get apples, and then it is a big expense, but there is something then to bring in a little money, especially where you are selling McIntosh at \$14.75 a barrel and Delicious at \$5 a box.

For two years, when apples were cheap, we put in a canning factory, and we canned all the windfalls and the culls, and in those years we came out a good deal ahead by doing that. We couldn't get very much for the windfalls. One reason why you cannot sell any good apples in this county is because they bought two carloads of windfalls at \$4.75 in Charlotte.

HOW TO IMPROVE THE HOME GROUNDS.

ABSTRACT FROM ILLUSTRATED ADDRESS. PROFESSOR F. A. WAUGH, AMHERST, MASS.

How to improve home grounds, especially those of the farm home, was discussed in a chalk-talk by Capt. Frank A. Waugh of the Massachusetts Agricultural College. He took up first the arrangement of the farm buildings. The New England plan of stringing them all out in a row has advantages and disadvantages. The aimless scattering of buildings is bad management. The speaker said that scientifically the best plan was to place the buildings in a quadrangle, the house facing the road and the barn at the rear. The grounds about any home should be divided into three portions corresponding to the three portions of the house. These are the public, the private and the service areas. The front lawn is for the public and connects with the front hall of the house. There should be a private garden in which the family should live during certain parts of the year. Then there should be a service area connected with the kitchen. Here the washing may be hung out, the milk-cans aired and other necessary domestic activities carried on. A few good native trees, a small carpet of well-kept lawn, some hardy shrubs such as lilacs and roses, will give any house an air of prosperity and contentment and will make it look more like a home.

REPORT OF SECRETARY.

M. B. CUMMINGS.

It is a matter of much satisfaction that the Horticultural Society has "come back" since the close of the war. Our meetings during the period of the war were not what they were in the prewar days, but we have come back now, and we are on the old basis again. Horticultural work was not greatly hampered by war conditions, but many people were too much occupied with routine work to attend meetings.

Despite the hardships arising from the days of the great war, many good things are likely to come. The necessity for better methods of culture, more thorough control of pests and less expensive production by the more frequent use of labor-saving machines is now imperative. The real reason for more high grade products and for less waste was never more emphatic than during the recent months of stress and distress.

The coming of peace and prohibition seem to be closely associated with higher and still higher prices for horticultural products. The promising outlook in the commercializing of the fresh juice trade is no insignificant thing. Notwithstanding attractive prices for poor apples generally known as cider stock, let us hope the day is not far off when not merely the ideal but the real thing in Vermont orchards will be the production of only first class apples. The commercial orchards that have been set within the past 10 years, point in that direction.

All of these things then are matters of fact, also matters of real inspiration. But an inquiring mind is prompted to ask what is ahead? It is not given to any man to reveal the future; but there are some things for us to be considering even now. What of the future of our Society? What is the trend? As I see it, it is in three directions:

1st, toward a smaller proportional membership of practical horticulturists and a proportionately larger number of people in other lines of endeavor. We probably have as large a number of bona fide horticulturists in our society now as we are ever likely to secure. But our membership list has always been too exclusive. We need many people of other interests, and we must get them. We need market men, and business men; we need school teachers, lawyers, or rather lawmakers, scientists and naturalists to keep up

broad and liberal in our views and in our forward movements. There is not merely *room*, but *need* of influential men to give ballast and balance.

2nd, toward fewer types of subjects. Addresses on vegetables and flowers have seldom appealed to large numbers of our people. But everybody knows something about apples and apple culture and desires to know more. Our exhibitions were of horticultural products, then they were of orchard products, but now they are merely apple shows! I do not presume to say that this trend is altogether best and justifiable, but it is a fact.

3rd, toward the cities only for places for our meetings. The outlying towns have never been able to do much for us. The attendance has been small from within and from without the town. We might as well decide now, never to go for the annual meeting to a place of less than 6,000 people. In fact Rutland is about ideal for us in all respects.

Before closing my report I desire to mention another matter of vital concern to the society. No enterprise is completely satisfactory or satisfying unless it is essentially cooperative. The real work of our society has always been done by a small number of people. It is something like a ball game where a thousand watch and two dozen play. In a society like ours, which embraces a commonwealth, there is work of real value for everybody. The more one does, the more he gets. There is much to do, there are many to enlist. How shall we secure a larger cooperative service, and thereby a better horticultural society? Will you not all ask yourselves this question? And then answer it by some sort of volunteer service? I trust that no one feels that he has fully embraced his opportunity or fulfilled his obligations to the Society, by merely paying his dues. Our society will be what you make it. Men and Women, the task is neither mine nor yours, but Ours!

REPORT OF TREASURER.

W. C. COLTON.

SUMMARY.**RECEIPTS.**

Cash on hand,	\$ 394.95
State appropriation,	500.00
Dues,	62.00
Interest,	12.00
	\$ 968.95

EXPENDITURES.

Officers' expense and salary,	\$ 248.27
Lecturers' expense and fees,	118.91
Premiums,	62.00
Miscellaneous,	138.69
Cash on hand,	401.08
	\$ 968.95

RECEIPTS IN DETAIL.

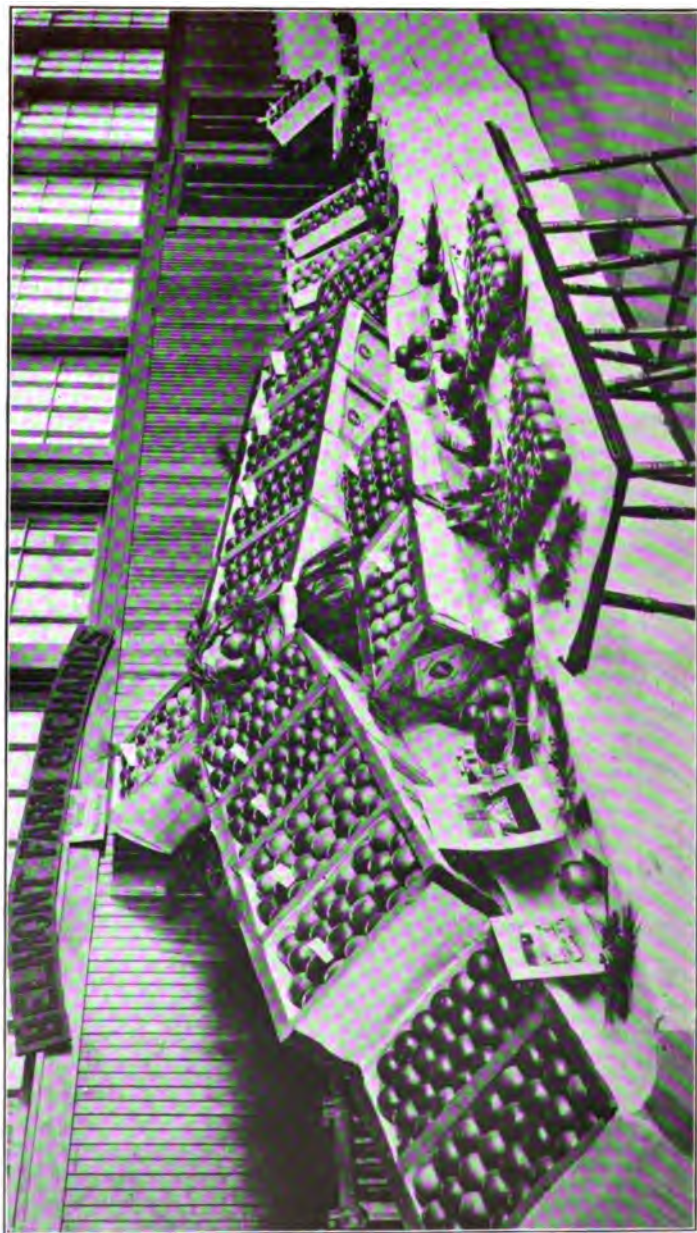
1918		
Nov. 15	Cash on hand,	\$ 394.95
23	Cash from Secretary, dues,	23.00
Dec. 3	Cash from Secretary, dues,	14.00
1919		
Jan. 1	Interest on deposits,	3.14
Feb. 5	Cash from Secretary, dues,	19.00
21	State appropriation,	500.00
July 1	Interest on deposits,	8.86
Aug. 11	Cash from Secretary, dues,	6.00
		\$ 968.95

EXPENDITURES IN DETAIL.

1918		
Nov. 30	St. Johnsbury House, St. Johnsbury, Vt.	\$ 65.00
30	W. C. Colton, Montpelier, Vt.,	3.54
30	Luther Putnam, Cambridge, Vt.,	9.25
30	The Orchards, Bennington, Vt.,	7.25
30	W. F. Ranney, Westminster, Vt.,	11.50
30	W. C. Holcomb, Isle LaMotte, Vt.,	3.00
30	C. L. Witherell, Middlebury, Vt.,	17.50

	30	A. T. Clark, Vergennes, Vt.,	7.00
	30	E. H. Hallett, St. Johnsbury, Vt.,	6.00
	30	R. H. Holmes, Mgr. Diamond Orchards, Shoreham, Vt.,	.50
	30	B. S. Brown, Orono, Maine,	34.42
Dec.	11	M. B. Cummings, Burlington, Vt.,	20.02
	11	R. H. Holmes, Shoreham, Vt.,	10.00
	11	Geo. D. Aiken, Putney, Vt.,	7.94
	11	J. J. Dansro, No. Clarendon, Vt.,	35.95
	17	Geo. W. Perry, Chester Depot, Vt.,	6.84
	17	L. R. Taft, E. Lansing, Mich.,	10.00
	20	Geo. D. Aiken, Putney, Vt.,	3.00
	17	E. H. Hallett, St. Johnsbury, Vt.,	11.00
	20	M. B. Cummings, Burlington, Vt.,	20.00
	20	Miss V. Idris Roberts, Burlington, Vt.,	4.12
	20	W. C. Colton, Montpelier, Vt.,	3.00
	20	C. L. Witherell, Middlebury, Vt.,	31.70
	31	Free Press Asso., Burlington, Vt.,	4.10
	31	Miss S. A. Nott, Burlington, Vt.,	40.04
1919			
Jan.	25	McAuliffe Paper Co., Burlington, Vt.,	4.30
	25	Barrett Bindery Co., Chicago, Ill.,	3.00
Mar.	18	M. B. Cummings, Burlington, Vt.,	9.69
	18	Geo. D. Aiken, Putney, Vt.,	14.43
	18	C. L. Witherell, Middlebury, Vt.,	19.49
	18	Miss V. Idris Roberts, Burlington, Vt.,	4.12
Apr.	11	M. B. Cummings, Burlington, Vt.,	12.46
May	31	C. L. Witherell, Middlebury, Vt.,	6.47
	31	M. B. Cummings, Burlington, Vt.,	100.00
July	14	Miss Idris Roberts, Burlington, Vt.,	4.12
Oct.	20	M. B. Cummings, Burlington, Vt.,	14.87
	20	Miss V. I. Roberts, Burlington, Vt.,	1.00
	20	McAuliffe Paper Co., Burlington, Vt.,	1.25
Nov.	10	Cash on hand,	401.08
			\$ 968.95





One of the many instructive displays at the Rutland 1919 Exhibition. Delicious and Winter Banana feasts, for the eye.

THE VERMONT EXHIBIT AT THE NEW ENGLAND FRUIT SHOW.

C. L. WITHERELL, MIDDLEBURY.

As you perhaps know, the prices of apples are rather high this year, and it is impossible to get growers to make an exhibit or donate fruit for the purpose of putting up a State exhibit. When we can get \$4 and \$5 a box and \$14.75 a barrel, growers would rather retain their fruit and put the money in their pockets. As a rule, when we ship to a show like the New England Fruit Show, the fruit is disposed of after the show to local buyers, and occasionally we find a good market, but the Providence market is considered lower than the Boston and New York, and this year we found it exceedingly low. There were only three exhibitors from the State that contributed, and there was something like 15 boxes, so that it was necessary to put up an artistic display rather than a commercial exhibit, and before I go any further I will show you the picture of the exhibit. We got the center of the hall for this exhibit, and right in front of the main doorway, and we arranged these boxes with Vermont pine and holly berries, which made a very attractive display.

At the show there were something like 75 plates and only five boxes, and Vermont won 21 first prizes, 15 second prizes, and 3 third prizes, a total of \$169.00 in money for the three exhibitors, the Orchards at Bennington, winning the largest money. I believe there were only two premiums taken on the boxes, and the others were for plates arranged artistically on the tables. These apples were arranged in different forms, and the premiums were large for that sort of a display, \$10 and \$15. I hope that we will be able, at the next session of the legislature, to get an annual appropriation for the State Exhibit at the New England Fruit Show, because the other New England States are making large exhibits. I understand that Connecticut had \$4,000 this year for a State Exhibit. Very likely Connecticut will have this show next year, for Vermont will not be able to make a large exhibit on account of the lack of an appropriation, but I hope the growers will begin to plan now to send in some fruit that can be used to good advantage. Perhaps next year we can get an appropriation and do better work.

AWARDS IN 1919.

APPLES ON PLATES.

Variety.		1st Prize	2nd Prize
Baldwin,	E. H. West, Dorset, C. L. Witherell, Middlebury,	\$ 1.00	\$.50
Bellflower,	R. R. MacRae, Castleton, Grand Isle Fruit Co., Grand Isle,	1.00	.50
Delicious,	C. L. Witherell, Middlebury, A. O. Ferguson, Burlington,	1.00	.50
Fallwater,	Grand Isle Fruit Co., Grand Isle,	1.00	
Fameuse,	E. H. West, Dorset, A. T. Clark, Vergennes,	1.00	.50
Grimes Golden,	The Orchards, Bennington,	1.00	
Hubbardston,	The Orchards, Bennington,	1.00	
Jonathan,	The Orchards, Bennington, Grand Isle Fruit Co., Grand Isle,	1.00	.50
King,	The Orchards, Bennington, Grand Isle Fruit Co., Grand Isle,	1.00	.50
McIntosh,	E. H. West, Dorset, R. R. MacRae, Castleton,	1.00	.50
N. Spy,	E. H. West, Dorset, R. R. MacRae, Castleton,	1.00	.50
N. W. Greening,	E. H. West, Dorset, The Orchards, Bennington,	1.00	.50
Roxbury Russet,	Miss McCormack, West Rutland, Grand Isle Fruit Co., Grand Isle,	1.00	.50
R. I. Greening,	E. H. West, Dorset, The Orchards, Bennington,	1.00	.50
Shiawassee,	G. E. L. Badlam, Rutland,	1.00	
Spitzenburg,	C. L. Witherell, Middlebury, The Orchards, Bennington,	1.00	.50
Tolman Sweet,	The Orchards, Bennington, Grand Isle Fruit Co., Grand Isle,	1.00	.50
Wagener,	R. R. MacRae, Castleton, The Orchards, Bennington,	1.00	.50
Wealthy,	The Orchards, Bennington, E. H. West, Dorset,	1.00	.50
Wolf River,	E. H. West, Dorset, R. R. MacRae, Castleton,	1.00	.50
Winter Banana,	C. L. Witherell, Middlebury, R. R. MacRae, Castleton,	1.00	.50

PLATE COLLECTIONS.

The Orchards, Bennington, 3.00

BEST GENERAL DISPLAY.

The Orchards, Bennington, 5.00

BEST ARTISTIC DISPLAY.

R. R. MacRae, Castleton, 10.00
C. L. Witherell, Middlebury, 5.00

SHALLOW BOX DISPLAYS.

McIntosh,	E. H. West, Dorset,	3.00	
	C. L. Witherell, Middlebury,		2.00
Baldwin,	E. H. West, Dorset,	3.00	
Fameuse,	E. H. West, Dorset,	3.00	
N. Spy,	E. H. West, Dorset,	3.00	
Winter Banana,	C. L. Witherell, Middlebury,	3.00	
Delicious,	C. L. Witherell, Middlebury,	3.00	
Wolf River,	E. H. West, Dorset,	3.00	

STANDARD BOX DISPLAY.

McIntosh,	E. H. West, Dorset,	5.00	
Fameuse,	E. H. West, Dorset,	5.00	
No. Spy,	E. H. West, Dorset,	5.00	
Wolf River,	E. H. West, Dorset,		2.00
Delicious,	C. L. Witherell, Middlebury,	5.00	
Grimes Golden,	The Orchards, Bennington,	5.00	

BEST BARREL EXHIBIT.

N. Spy,	E. H. West, Dorset,	8.00	
N. W. Greening,	E. H. West, Dorset,	8.00	

FIVE \$10 BOX PRIZES BY GOV. P. W. CLEMENT.

Fameuse,	E. H. West, Dorset,	10.00	
No. Spy,	E. H. West, Dorset,	10.00	
Fameuse,	E. H. West, Dorset,	10.00	
Delicious,	C. L. Witherell, Middlebury,	10.00	
Grimes Golden,	The Orchards, Bennington, Sweep-stake Box,	10.00	

BEST BARREL FACINGS.

No. Spy,	E. H. West, Dorset,	3.00	
Baldwin,	E. H. West, Dorset,	3.00	
	C. L. Witherell, Middlebury,		2.00
N. W. Greening,	E. H. West, Dorset,	3.00	
R. I. Greenings,	E. H. West, Dorset,	3.00	
Wolf River,	E. H. West, Dorset,		2.00

BEST PLATE COLLECTION OF PEARS.

A. T. Clark, Vergennes,	3.00
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BUSINESS SESSION.

Chairman George W. Perry of the Nominating Committee recommended the election of officers, as named on the title page of this report, and by common consent the secretary cast a ballot for them.

Mr. C. L. Witherell was elected State Vice President for Vermont for the New England Fruit Show, and he was authorized to select two other persons to act with him in securing and placing a Vermont exhibit at the next show.

It was also voted to authorize the Executive Committee to secure, if possible, \$200 for a Vermont exhibit at the next New England Fruit Show.

In regard to further funds for the Society, it was voted that the Executive Committee be empowered to solicit from large and small growers and other people to get money for advancing the interests of the Horticultural Society and its work.

BULLETINS ON THE FRUIT INDUSTRY.

BELOW ARE SOME INSTRUCTIVE BULLETINS, WHICH ARE PROBABLY FREE UPON REQUEST.

Preparation of Barrelled Apples for Market, United States Department of Agriculture, Washington, D. C., Farmers Bulletin No. 1080.

Unfermented Grape Juice. Farmers Bulletin No. 1075. Address as above.

Drying Fruits and Vegetables in the Home. Farmers Bulletin No. 841. Address as above.

Home Canning of Fruits and Vegetables, Farmers Bulletin No. 853. Address as above.

Home Drying of Fruits, Farmers Bulletin No. 841. Address as above.

Plant Lice Injurious to Apple Orchards and New and Old Varieties of Fruits. Bulletin No. 431 and No. 403 respectively. Exp. Station, Geneva, N. Y.

Fertilization of Apple Orchards, Penn. Exp. Station, Bulletin No. 153, State College, Pa.

LIST OF MEMBERS.

MEMBERSHIP:—Anybody interested in horticulture in any of its phases,—the culture of fruits, flowers or vegetables, or ornamentals or the marketing or preserving of these products, is eligible to membership. Annual membership costs \$1.00; life membership \$5.00, with back reports.

LIFE MEMBERS.

Aldrich, A. W.....	Springfield	Holmes, R. H.....	Shoreham
Allen, R. R.....	South Hero	Horton, Mrs. G. B.....	Montpelier
Anderson, William J.,		House, George H.....	Beebe Plains
Mount Hermon, Mass.		Howard Bros.	W. Hartford
Ashley, M. W.....	Hardwick	Howe, M. A.....	Northfield
Badlam, G. E. L.....	Rutland	Hubbard, George C.,	
Bartlett, H. C.....	Orleans		Red Hook, N. Y.
Bristol, E. S.....	Vergennes	Kinney, T. L.	So. Hero
Buxton, B. C.....	Middletown Springs	Knapp, C. E.....	N. Bennington
Buxton, Mrs. B. C.,		Kneeland, D. A.....	Waitsfield
Middletown Springs		Jacobs, Mrs. E. C.....	Burlington
Chenoweth, Prof. M. W.,		Lutman, Prof. B. F.....	Burlington
Amherst, Mass.		McFarland, F. H.....	Waterville
Christopher, John,		Merrill, H. J. & Son.....	Burlington
Jacksonville, Fla.		Moody, M. H.....	Waterbury
Clark, A. T.....	Vergennes	Ormsbee, C. O.....	Montpelier
Cummings, Prof. M. B...	Burlington	Parmalee, C. H.....	Wilmington
Curtis, E. D.,		Pease & Tinkham.....	Burlington
Avalon Farms, Bantam, Conn.		Peters, J. H.....	N. Bennington
Dansro, J. J.	No. Clarendon	Pratt, B. G.,	
Darrow, George M.,		50 Church St., New York City	
Dept of Agri., Washington, D. C.		Ranney, W. F.....	Westminster
Darrow, William,		Sargent, F. H.,	
Dept of Agri., Washington, D. C.		Carnegie Hall, New York City	
Dawley, F. R.....	Montpelier	Sears, Prof. F. C....	Amherst, Mass.
Deavitt, E. H.....	Montpelier	Small, F. M.....	Morrisville
Dimock, Julian	East Corinth	Stafford, D. H.....	Brattleboro
Dow, H. N.....	Middlebury	Stevens, J. M.....	Orwell
Dunbar, Mrs. F. W....	Manchester	Stuart, Prof. Wm.,	
Emery, C. S.....	Newport	Dept. of Agri., Washington, D. C.	
Foster, Col. H. S.....	North Calais	Teer, Frank.....	W. Rutland
Freeborn, A. C.....	Proctor	Terrill, Hon. George....	Morrisville
Freeborn, Mrs. A. C.....	Proctor	Vail, Theodore N.....	Lyndonville
Gale, Dr. C. A.....	Rutland	Vaughan, A. M.....	Shelburne
Hartness, Mrs. James..	Springfield	Vaughan, R. E.....	Madison, Wis.
Hemenway, R. L.....	Bridport	Waugh, Prof. F. A. Amherst, Mass.	
Hildreth, E. L.....	Brattleboro	West, E. H.....	Dorset
Hill, A. H.....	Isle La Motte	Wilbur, J. B.....	Manchester
Hitchcock, J. W.....	Underhill	Wister, John C....	Germantown, Pa.

ANNUAL MEMBERS.

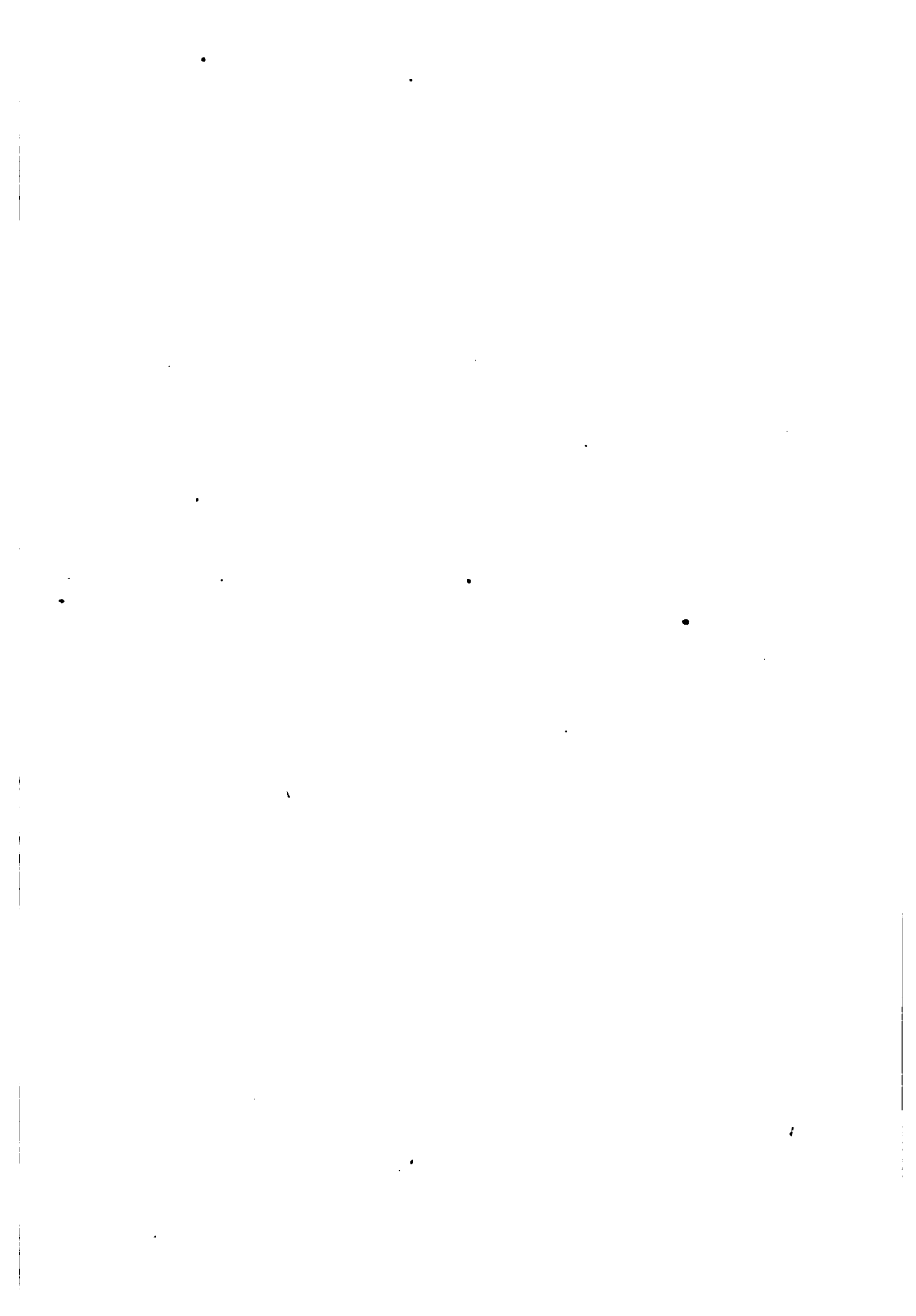
Abbott, Charles A...	Antrim, N. H.	Bachelor, F. E....	Lawrence, Mass.
Adams, Herbert,		Bacon & Company..	Gasport, N. Y.
131 W. 11th St., New York City		Bailey, George	Newport
Adams, Samuel,		Bailey, H. A.....	Bradford
329 Plymouth Ct., Chicago, Ill.		Bailey, J. A.....	Newport
Aiken, George	Putney	Baldwin, Hon. H. T....	Wells River
Albyn, H. A.....	Bennington	Ball, H. J.....	West Derby
Aldrich, C. F.....	Springfield	Ball, J. C.....	Arlington
Alexander, W. H.....	West Brattleboro	Ballard, S. S.....	Montpelier
Ames, H. L.....	Burlington	Bancroft, Leonard	Montpelier
Ashley, Charles	Shoreham	Barrett, F. W.....	Poultney

Barrett, J. K.....	Concord	Carleton, F. P.....	Montpelier
Barrie, George N.,		Carleton, H.	Montpelier
Woodland Road, Brookline, Mass.		Carr, E. W.	No. Calais
Barrows, E. B.....	Brattleboro	Casey, T.	Bristol
Bentley, W. A.....	Jericho	Chalmers, G. E.....	Rutland
Bigelow, C. H.....	Randolph Center	Chapin, H. B.....	Middlesex
Bishop, George E.....	Brattleboro	Chapin, E. E.	Pittsford
Blair, J. C.....	Warren, Pa.	Chapman, F.	Woodstock
Blakely, G. M.....	St. Johnsbury	Chase, I. P.	Richford
Blanchard, A. C.....	Montpelier	Cheever, O. L.....	Montpelier
Blanchard, F.	Montpelier	Cheney, G. A.....	White River Jct.
Blanchard, J. E.....	Newport	Church, R. M.....	Rutland
Blood, L. L.,		Clark, C.	Dorchester, Mass.
295 Willetto Ave.,		Clark, Winslow	Shoreham
New London, Ct.		Collins, Dr. J. E.....	Lisbon, N. H.
Bogue, Nelson	Batavia, N. Y.	Collins, J. P.....	Rutland
Bohlender, P.....	Tippecanoe, Ohio	Collins, W.	Westminster
Bowman, N. A.....	Montpelier	Colton, W. C.....	Montpelier
Boyden, C. I.....	Randolph Ctr.	Conney, A. D.....	Lowell, Mass.
Bradley, J. C.,		Coon, L. F.....	Bomoseen
N. Tonawanda St., Buffalo, N. Y.		Conder, R. E.,	
Brewer, G.	Burlington	Box 5077, Boston, Mass.	
Briggs, John W....	Mt. Vernon, Ohio	Corey, C. E.....	Putney
Brigham, Hon. E. S.....	St. Albans	Corse, S. W.....	Montpelier
Brigham, L. W.....	Middlebury	Crane, J. E.....	Middlebury
Bristol, R. H.....	Vergennes	Crane, Leslie	Rutland
Britton Fruit Grader Co.,		Crawford, H. H.....	South Hero
Chamber Commerce,		Cuneo, Mrs. J. N.,	
Rochester, N. Y.		Lake Rapoda, Wilmington	
Broadfoot, A.	Montpelier	Currier, P. W.....	Montpelier
Brock, Dr. W. W.....	Montpelier	Dana, F. B.....	Woodstock
Brockway, Dan S.....	W. Hartford	Davis, Hon. F. L....	White River Jct.
Brooks, George W.,		Davis, H. W.,	
White River Jct.		115 Broadway, New York City	
Brooks, H. K.....	Swanton	Demary, Jackson	Geneva, N. Y.
Brooks, John	Montpelier	Deming Co.	Salem, Ohio
Brooks, Theron C.....	Randolph	Donnehy, G. W.,	
Brown, F. Howard.	Marlboro, Mass.	99 Nassau St., New York City	
Brown, George	Burlington	Dennison, J. C.....	Bellows Falls
Brown, William	Montpelier	Dike, A. C.....	Bristol
Brown, W. J....	Middletown Springs	Dings, Arthur	So. Royalton
Brownell, Hon. C. W....	Burlington	Doane, M. E.	
Buck, A. E.....	Northfield	Care National Cooper Journal,	
Buck, W. B.,		Philadelphia, Pa.	
409 Empire Bldg., New York City		Dodds, W. B.....	North Hero
Bugbee, Dr. L. H.....	Putney	Dolan, C. J.....	Derby, Conn.
Burbank, A. C.....	St. Albans	Doule, F. H.	Somerville, Mass.
Burbank, Harvey	Danville	Dow, Charles	Springfield
Burnham, G. A.....	Lyndonville	Dow, W. H.....	Middlebury
Burns, Prof. G. P.....	Burlington	Drew, F. A.....	Burlington
Burritt, M. C.....	Ithaca, N. Y.	Dunkle, W. H....	West Brattleboro
Buson, H. T.....	Newark, N. J.	Dunning, D. B.....	Winooski
Cady, W. N.....	Middlebury	Dunsmore, G. H....	St. Albans Bay
Campbell, Dr. E. R.....	Montpelier	Durram, P. P.....	N. Ferrisburg
Campbell, F. P.....	Wilders	Eastman, A. W.....	Groton
Campbell, George	Montpelier	Eagles, A. E.,	
Campbell, H. J.....	Yonkers, N. Y.	108 State St., Chicago, Ill.	
Carmichael, G. A....	Shannock, R. I.	Eastwood, John.....	Stamford

Eaton, A. J.....	So. Royalton	Grover, F. C.....	Rochester, N. Y.
Eddy, D. W.....	No. Ferrisburg	Hale, F. H.....	Windsor
Eddy, Miss M. G....	No. Ferrisburg	Hall E. B.	Castleton
Estee, Hon. J. B.....	Montpelier	Halladay, A. A.....	Bellows Falls
Everett, Howard S....	Bennington	Halladay, G.	Bellows Falls
Fair, W. D.....	N. Calais	Hallett, E. H.....	St. Johnsbury
Farley, A. J.....	New Brunswick, N. J.	Hamilton, Mrs. F. L.....	Salisbury
Farrar, H. A.....	Castleton	Hammond, Dwight.....	Newport
Faulkner, Mrs. E. D....	Woodstock	Hammond, E. M....	River Forest, Ill.
Fay, M. A.....	St. Johnsbury	Hanley, D. T.....	Montpelier
Ferguson, A. O.....	Burlington	Hanley, E. E.....	Westminster
Ferguson, Hon. C. J....	Burlington	Harrison, J. G.....	Berlin, Md.
Fish, Hon. F. L.....	Vergennes	Hartung, Wm. J....	Rochester, N. Y.
Fitch, C. W.....	Montpelier	Haskell, A. L.....	S. Woodbury
Flagler, Grace E.....	Castleton	Everett, Howard S. So.	Bennington
Fletcher, E. E.....	South Hero	Heald, A. N.,	
Flint, J. P.....	Montpelier	Old So. Bldg., Boston, Mass.	
Foote, F. E.....	Middlebury	Hemenway, H. L.....	Bridport
Foote, L. B.....	Middlebury	Heath, H. J.....	Townshend
Ford, E. C.....	Ludlow	Heaten, C. H.....	Montpelier
Franklin, P. E.....	Brattleboro	Higgen, C. H....	Arlington, Mass.
French, John	Burlington	Hill, Elmer.....	South Hero
Friend Mfg. Co.....	Gasport, N. Y.	Hill, Henry F.....	Waterbury Ctr.
Fullam, O. P.....	Westminster	Hilman, Wm. F.,	
Gardner, R. O.,		Lake Dunmore, Salisbury	
51 Market St., Boston, Mass.		Hinman, W. S.....	Bennington
Gassett, G. H.....	Putney	Hitchcock, S. E.....	South Hero
Geal, Leslie	Montpelier	Holbrook, F. C.....	Brattleboro
Gebicke, A.	Burlington	Holcomb, W. C.....	Isle La Motte
Gidford, H. G.,		Holmes, C. T.....	Charlotte
111 Broadway, New York City		Hollister, F. S....	Cincinnati, Ohio
Gilbert, H. P.....	Dorset	Horsford, F. H.....	Charlotte
Gold, C. L....	West Cornwall, Conn.	Horsford, Miss Genevieve,	
Gomo, O. H.....	East Fairfield	Charlotte	
Goodhue, W. E.....	Brattleboro	Howland, F. A.....	Montpelier
Goodnow, A. M.....	Brandon	Howe, C. D.....	Morrisville
Goodrich, B. F.....	Akron, Ohio	Howe, S. O.....	Randolph
Gordon, Mrs. S. P.....	Grand Isle	Hutchings, F. F.....	Castleton
Gould, W. M.....	Newark, N. J.	Herrick, W. F. So.	Lyndboro, N. H.
Gourley, Prof. J. H..	Durham, N. H.	Howard, K. H.....	Randolph
Gove, Elmer E.....	Burlington	Harrington, L. J.....	Randolph
Grand Isle Fruit Co.,		Hawley, E. E.....	Westminster
cc. A. S. Gallup.....	Burlington	Hardie, F. E.....	Bradford
Granger, C. H.....	Rutland	Hoag, J. B.....	Grand Isle
Graves, E. W.....	Vergennes	Horton, Guy B.....	Burlington
Green, G. L.....	Randolph Center	Holett, H. A.....	Arlington
Greene, George,		Houston, J. P. & Son,	
Middletown Springs		Mansfield, Conn.	
Greene, Max E.,		Hubbell, Mrs. M. G.....	Marlboro
Middletown Springs		Jackson, Louis.....	Rutland
Grief Bros.	Cleveland, Ohio	Jacobs, H. B.....	Vergennes
Griffin, Dr. C. E.....	Fair Haven	James, C. S.	Middlebury
Grout, Dr. A. J.,		James, John	Middlebury
New Dorp, Rich. Borough,		Jenne, Dr. J. N.....	Burlington
New York City		Jennings, W. A.....	Orwell
Grout, Mrs. A. J.,		Johnston, J. W....	West Brattleboro
New Dorp, Rich. Borough,		Jones, D. E.....	Middlebury
New York City		Jones, E. H.	Waterbury, Conn.

Joslyn, E. J.	Newport	Osgood, M. P.	Townshend
Kelley Bros.	Danville, N. Y.	Otis, C. W.	Middlebury
Kelsey, George C.	Salisbury	Package Sales Co.	So. Bend, Ind.
Kelton, E. F.	Randolph	Page, F. E.	Putney
Kent, M. A.	Montpelier	Parker, D. H.	Windsor
Keyes, Caroline	Putney	Parker, J. A.	Waterbury
Kibbey, E. F.	Randolph	Parsons, W. E.	Bellows Falls
Kingsland, H. H.	N. Ferrisburg	Perry, Rev. G. W.	Chester Depot
Ladd, A. J.	Northfield	Phillips, Hon. C. F.,	
Landon, T. B.	South Hero	New Brighton, Staten Island, N. Y.	
Lane, C. R.	Middlebury	Piddock, Col. J. E. Saxton's River	
Larrabee, W. G.	Shoreham	Pierce, T. C.	N. Clarendon
Lawson, A.	Newport	Pike, P. B.	Stowe
Lawson, William	Newport	Pilson, Philip.	Essex Junction
Ledeux, W. H.	Grand Isle	Pollard, L. H.	Montpelier
LePage, Mrs. Charles.	Barre	Powers, H. S.	Ryegate
Leslie, George W.	Montpelier	Prey, C. H.	Manchester
Libby, F. J.	Newport	Putnam, L.	Cambridge
Loomis, E. N.,		Quimby, P. C.	St. Johnsbury
95 Barclay St., New York City		Ranle, Geo. N.,	
Loomis, L. M.	No. Bennington	Woodland Road,	
Lovell, M. C.	Springfield	Chestnut Hill, Mass.	
Lyndon School of Agr.	Lyndon Ct.	Ray, O. F.	Northfield
Macomber, G. H.	Grand Isle	Raymond, L. H.	Middletown Spgs.
Magid, L. B.,		Reilly, W. J.	Danville, N. Y.
Tallulah Park, Atlanta, Ga.		Richardson, C. W.	Brattleboro
Manchester, John.	Rutland	Richardson, L. H.	Brattleboro
Manchester, Philip ..	Middlebury	Richmond, C. W.	Newport
Marsh, G. F.	Chester Depot	Roberts, C. B.	Montpelier
Marsh, L. L.	Enosburg Falls	Robinson, Wallis.	South Hero
Martell, F. J.	Montpelier	Robinson, W. E.	Newport
Martin, Hon. O. L.	Plainfield	Robinson, Mrs. W. E.	Newport
Mass, Geo. H.	Woodstock	Root, L. C.	Farmington, Conn.
Matthews, V. H.	Galla, Ill.	Ruggles, A. B.	West Burke
McNabo, J. F.	Manchester Ctr.	Russell, C. L.	Norwich
MacRae, Mrs. R. R.	Castleton	Senter, C. H.	Montpelier
MacRae, R. R.	Castleton	Seymour, Edward,	
Meigs, G. A.	Randolph Ctr.	45 Wall St., New York City	
Merrill, T. R.	Montpelier	Shaw, Dr. J. K.	Blacksburg, Va.
Miller, D. R.	Putney	Shea, C. J.	Marshfield
Miller, W. W.	Greensboro	Sibley, A. J.	Montpelier
Miner, E. E.	Middletown Spgs.	Sims, J.	Ryegate
Minkler, Mrs. C. E.	South Hero	Slayton, Isaac A.	No. Calais
Minkler, C. E.	South Hero	Smith, Charles A.	Montpelier
Mitchell, James	Barre	Smith, C. N.	Burlington
Modoc Company		Smith, C. P.	N. Clarendon
1040 Drexel Bldg., Philadelphia, Pa.		Smith, Ezra.	Vergennes
Moon, Owen, Jr.	Woodstock	Smith, F. H.	Ludlow
Morrow, M. C.	Arlington	Smith, Hon. C. F.	Morrisville
Morse, George H.	Burlington	Smith, H. M.	Montpelier
Moseman, Edward M.,		Smith, L. E.	Pittsford
West Brattleboro		Smith, P. S.	Montpelier
Newton, A. J.	Brattleboro	Smith, S. W.	Addison
Noonan, S.	N. Ferrisburg	Southworth, P. D.,	
Norton, Clifton.	Quechee	Roswell, N. Mexico.	
O'Connor, P. H.	N. Calais	Spencer, W. S.	Milton
Ordway, C. D.	Burlington	Stanley, Dr. E. A.	Waterbury
Osgood, L. K.	Rutland	Stanton, J. B.	St. Johnsbury

Stark, L. C.....	Louisiana, Mo.	Wells, A. R....	Newport, R. D. 1
Steward, J. A.....	Rutland	Wentzell, Paul..	Manchester Depot
Stone, W. C.....	Geneva, N. Y.	West, Mrs. E. H.....	Dorset
Stratford Chem. Co.,		Westermayer, A. J.,	
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Tarbox, C. F.....	Rutland	Whiting, A. C.....	Burlington
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Tenning, G. H.....	Putney	Wilbour, J. B.....	Manchester
Tera, T.....	Los Angeles, Cal.	Wilder, Mrs. H. H....	South Hero
Thwing, George H.....	Putney	Witcher, H. N.....	Wells River
Titus, E. V.....	Glen Cove, L. I.	Wiltfrank, F.....	South Hero
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Totman, H. M.....	Randolph	Wister, J. C.....	Germantown, Pa.
Townshend, J. W....	Selbyville, Del.	Witherell, C. L.....	Middlebury
Townshend, A. H.....	Burlington	Witherell, Mrs. C. L..	Middlebury
Tracy, J. E.....	Burlington	Witherell, H. W.....	Shoreham
Trombly, D. T.....	Isle La Motte	Woorman, W. M....	Lynchburg, Va.
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Vail, H. W.....	Randolph	Wright, G. H.....	Middlebury
Van Orman, R. B.....	Calais	Wright, H. J.....	Middlebury
Varney, Prin. A. W....	Bennington	Young, Alexander....	Bennington
Wagon, A. R.....	Newport	Young, A. I.....	Barre
Walker, L. M.....	W. Rutland	Young, I. R.....	Montpelier
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TWENTY-SIXTH ANNUAL MEETING
OF THE
Vermont Maple Sugar Makers' Association
AND FIRST ANNUAL MEETING
HELD IN CONJUNCTION WITH THE
FORTY-NINTH ANNUAL MEETING
OF THE
Vermont Dairymen's Association

Tuesday Forenoon Session, 10 A. M.

MR. H. B. CHAPIN, PRESIDENT, IN THE CHAIR.

MUSICIANS:

Pianist, Miss Fennell, Violinist, Miss Canning.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

Father of all the Spirits, Guide and Guardian of all nations, lover of all creatures that Thou hast made, we look unto Thee for Thy blessing on our hearts; that Thy Spirit may move us into a larger and closer association of mankind, into the prosecution of all high endeavor, into the love of all pure and noble things. We come to Thee with gratefulness because Thy mercy has lifted from us the shadow of the great war; we come to Thee with gratitude that Thou hast prolonged our lives and given to us richly to enjoy the fruits of the earth that nourish us. We come to Thee, Oh Mighty Spirit, with hopeful hearts that hereafter men shall live together in peace and harmony, that hereafter we may prosecute the same clean purpose in an earth that shall bring unto mankind a better Brotherhood, an association with and a closer and a livelier bringing together of all children of the sons of men; and with hopeful hearts we ask Thy blessing upon all the purposes of our meeting here that we may learn the great laws of Thy creation; that we may co-operate with Thee in the high and great purpose of bringing about a wider and a wiser life upon the earth that Thou hast given us to guard and keep. Bless Thou us in our toil and endeavors, lighten the darkness for us, give us the inspiration of a faith that looks onward and upward now and always,—in the name of Christ-like souls we would come into communion with Thee.

Amen.

ADDRESS OF WELCOME.

VERMONT ASSOCIATION.**JAMES P. TAYLOR, SECRETARY, THE GREATER***Mr. Chairman, Ladies and Gentlemen:*

As a member of the food administration during the last few months, I have talked a great deal about substitutes, but with the passing of the necessity of using food substitutes I had thought to hear nothing more of that word, but His Honor, the Mayor, has asked me to serve as a substitute and here I am and extend to you the greetings of the Queen City, which I am very happy to do, although I wish he could do it. We are mighty glad to have you here. We like you because you people represent organized activity. During the last two years the Vermont Maple Sugar Association has accomplished great things in the way of increased output, the raising of quality and increase of income into the State of Vermont. In New York City a certain magazine some time ago neglected to place the Green Mountains in making a map of New England. It put on the map the White Mountains, the Adirondacks and the Berkshire hills but entirely neglected the Green Mountains. I wrote that magazine stating the fact and the management sent the editor here. I enjoyed two or three days of tramping through the Green Mountains with him. He was greatly delighted with them but the things that impressed him most were not Vermont men—although we showed him some good ones; nor was it Vermont marble although he saw our best—but it was Vermont milk and Vermont maple syrup that made a lasting impression. When that editor went back to New York he wrote about it and what he said impressed others so that very soon members of the office began sending for maple syrup. I sent a few complimentary packages and on them pasted the following formula:

GREEN MOUNTAIN EXTRACT

Distillation of

“The Soul of Vermont”

CONSTITUENTS—Sweetness 49%;
Vigor 49%; Conservatism (as pre-
servative) 2%.

DIRECTIONS

For Doubt as to the existence of
the Green Mountains, one table-
spoonful.

For Skepticism as to the Perfect
Ideality of the Vermont Landscape,
two tablespoonfuls.

For Unbelief that Vermont Life en-
circles Perfect Happiness and mo-
nopolizes the Summum Bonum, three
tablespoonfuls.

NOTE—Use freely and often, for if
such diseases become chronic they
lead to excruciatingly painful deaths
followed by unspeakable agonies in
the world beyond.

That label took. The best thing about it, perhaps, was it was absolutely true and the most effective thing was that a dozen people in New York are now getting maple syrup—the pure stuff—from Vermont every year.

RESPONSE TO THE ADDRESS OF WELCOME.

BY THE SECRETARY, C. O. ORMSBEE, OF MONTPELIER.

Mr. Taylor, and Citizens of Burlington:—

In the absence of him to whom was delegated the honor of responding to your generous welcome, the pleasant duty devolves upon me. And, in behalf of the Vermont Maple Sugar Makers' Association I thank you.

It is no new experience for this association to meet in Burlington. I believe that this is the eighteenth time that we have met together in this city. As an organization we were born twenty-six years ago, not in Burlington, but we came to this city at a very early age. We came here when our total membership included but a small fraction of its present number. We came here when we were so young and weak and small, that just a pleasant nod of recognition, as one might greet a little child, was deemed a sufficient welcome for this Association. And we spent the greater part of our childhood and youth with you. Then came the restless period of transition from youth to manhood, and with it came the spirit of the wanderlust. In obedience to that spirit we travelled to various parts of the state. But to-day, as we round the first corner and enter the second quarter of our centenary, we return to Burlington, but not as the penitent prodigal returns in submission and humiliation to the home which he abandoned. We return as a strong and vigorous man, successful and prosperous, and in the full flush of early manhood, returns to the home of his childhood which he remembers only by the pleasant memories that cluster around it.

We come here knowing and expecting that we will receive the cordial welcome you have given us. And we know from past experiences, that it comes from the heart, and not merely from the lips. And we know that your welcome is the voice of all the citizens of Burlington. We come here knowing from past experiences that you will make all things so pleasant for us during our stay, that, when we leave, we shall do so with regret. And we come here hoping and expecting that our associations during the next few days may be such, that, when the time comes for us to take our departure, your expressions of regret may have the same ring of sincerity that has characterized the hearty welcome that you have given us. Again, I thank you.

PRESIDENT'S ADDRESS.

Ladies and Gentlemen:—

Again the Dairymen and Maple Sugar Makers of Vermont are met in joint annual convention in the Queen City on Lake Champlain and it seems very fitting and proper that we should join hands and hearts in one common effort to further the interests of these two industries and work together for the best good of our native state we all love so well.

Recognizing as we do that while not all dairymen are sugar makers nearly all sugar makers are dairymen, the dairy interest is the leading factor in our agricultural operations and the one around which all other lines of farming gather. Yet for genuine profit to the farmer for the time and money invested we hold that the making of maple sweets stands very near the head of the list of all the crops we produce on our farms. So let us help this coming year to develop in every way the resources of our great big agricultural state and especially develop her maple industry. Let us ever strive for quality in our product, and in maple products quality means flavor, that delicate, delicious and pleasing flavor which we, who were born and brought up in the state, know so well and which we wish to bring to the attention of consumers everywhere.

Did you ever hear of a consumer of maple products who did not want the very best goods that could be made or one who was not willing to pay the price if he knew he was getting the Simon-pure real thing? We want to send out goods that will bring back replies that will read something like this recently received from a lady in Kentucky, "The maple syrup has arrived. It is simply heavenly, we never tasted anything like it." It is more of this "simply heavenly" quality in maple sweets that will bring fame and fortune to our dear old Green Mountain State."

Of all the lines of industrial activity in Vermont there is none I believe that presents a better field for increased development than the Maple Sugar Industry.

Somewhat over five million maple trees are tapped each year in Vermont yielding from 2 to 2½ pounds of sugar per tree or about one third of a gallon of maple syrup per

tree per year, giving an income to the farmers of the state of at least \$2,000,000 per year. At present high prices for maple goods this sum would on the same basis of yield be increased by about \$1,000,000 per year, making the value of the annual crop approximately \$3,000,000; that is, from trees now tapped. In addition to this there are about 5,000,000 available maple trees in the state that are not at present used for sugar making; if these were utilized the cash returns would be about doubled; or to be conservative the maple sugar industry of Vermont could be made to give a cash annual return to producers of upwards of \$5,000,000,—no small sum to be secured from a side line or branch of the general farm operations. And the best part of it is there is quite a general consensus of opinion among maple sugar makers that one-half of the income is profit or clear gain.

We have, I think, had too poor an opinion of our state thinking of it as a little state, while in fact it is the largest New England state except Maine and by far the most important agricultural state in the group. Do you know that the products of the dairy industry in Vermont were worth \$20,000,000 for 1918? For Apples, \$1,000,000, Potatoes, \$4,664,000, Hay, \$21,043,000, Oats, \$4,223,000, Wheat, \$915,000 and so on through the list of her varied products including forest products from the farm woodlot, with a grand total value of all farm products for 1918 of around \$60,000,000, which is more than all the gold mined in the great states of California, Colorado and territory of Alaska for the same year.

The wood from the maple tree is the standard of fuel value wherever it is known. The lumber has a thousand different uses from ship keel to shoe lasts. In the birdseye variety it is one of the most beautiful woods for furniture and cabinet work and "a thing of beauty is a joy forever."

We in Vermont are in the heart of the sugar maple belt, which extends, roughly speaking, over the eastern half of the United States from the southern Appalachian Mountains to some distance north of the St. Lawrence river in Canada and from the North Atlantic States to the Great Lakes. Nowhere perhaps does it attain a fuller development or become so dominant a tree as in our Vermont woodlands, certainly nowhere else do soil and climatic conditions so favor the production of sugar from the sugar maple as in our state.

I have spoken of the value of this tree for fuel and lumber but its greatest value lies in the fact that a most

delicious sweet is found in its sap which flows so freely in the springtime, when the tree is tapped by the skillful sugar maker.

We are facing a new era for our state and country, a period we believe of greater development of all our resources. Our boys from overseas, who have fought the good fight for liberty, and from training camps, are returning in large numbers to all the walks of life, the valor and vigor of our population. They are laying down the implements of war to re-engage in the arts of peace; they are coming back to us with enlarged views of life, broadened and strengthened by experience and travel they will be able to take up the burdens of everyday life with such strength of purpose as will put a new vim into all our industries.

From the very first settlement of the state soon after the close of the Revolutionary War when the hardy sons of Connecticut, Massachusetts and New Hampshire came into the Green Mountains to hew for themselves homes out of the wilderness the fact that maple sugar could be made from the sap of the sugar maple in the early spring of each year has been one of the chief attractions to settlers, and this fact still gives added value to our farms and is still an inducement to all who are looking for new locations to take up their residence among our Green Hills.

The sugar maple is a wonderful tree, wonderfully beautiful at certain seasons of the year and at all times wonderfully useful.

“And when the autumn comes the kings of Earth in all their majesty are not arrayed as ye are.”

“Trees of the forest and the open field, * * *

Ye that my hands have planted or have spared beside the way or in the open meadow,

Ye whose boughs with every summer spread a wider shade, whose herd in coming years shall lie at rest beneath your noontide shelter * * *

Idly I ask, yet may the eyes that look upon you in your later, nobler growth look also on a nobler age than ours.”

WHAT IS THE MATTER WITH VERMONT MAPLE SUGAR?

BY C. O. ORMSBEE, OF MONTPELIER.

At the last Annual Meeting of this Association, I addressed you upon this same subject. Then I began my paper with these words:—"The title of my paper is a misnomer. It reads: What is the matter with Vermont maple sugar? It should read, What is the matter with the Vermont maple sugar maker? Vermont maple sugar is all right in every way shape and manner, but the Vermont maple sugar maker is a long way from being on his job." The expression is a little slangy and somewhat ungrammatical, but it is expressive. More than that, it expresses just the sentiments that I wish to utter, and so I use the same words to-day. Vermont maple sugar is all right in every way, shape and manner, but the Vermont maple sugar maker is a long way from being on his job.

Last year I showed you, that, while Vermont maple sugar is recognized wherever maple sugar is known as being of the very highest standard of excellence; and while Vermont maple sugar sells upon all the markets of the world at a higher price than maple sugar made in any other state; and while, for this reason, ninety per cent of all the maple sugar offered for sale is labelled Vermont maple sugar, no matter whether it originated in the forests of Vermont, or in the fourth story of a brick block on South Water Street, Chicago, the Vermont maple sugar maker,—the man who produces the goods, and who ought to receive the highest price, the man who ought to receive the reward of his skill in manufacture,—actually receives less per pound for his sugar, and less per gallon for his syrup, than the maple sugar maker of any other state in the Union, with two almost insignificant exceptions.

To-day, while speaking upon a closely related subject, I shall follow a different line. I shall show you, that, while Vermont, by reason of her environment and natural conditions ought to produce more maple sugar than any other state; and while you, as Vermonters and maple sugar makers throw out your chests and try to make believe that you are Almighty big, when you read that the little state

of Vermont produces annually, three quarters of a million pounds more maple sugar than all the other states combined, you are, actually, producing less, comparatively, than any other state in the Union. That is a fact! There is not a single one of the maple sugar producing states of the Union, but what produces more maple sugar, comparatively, when the sugar equivalent of the syrup is reckoned, than Vermont, in spite of all her boasting and publicity. This may be a disagreeable fact, but it is the fact, just the same.

You have heard Professor Jones say that the sap that a tree contains, is, in some measure, dependent upon the amount of moisture that the tree assimilated during the previous season. Or, in other words, the amount of sap that a tree contains bears some relation to the rainfall of the previous summer. You have also heard him say that the percentage of sugar contained in the sap is measured by the leaf area of the tree during the previous season. In several papers which I have read at previous meetings, I have told you the same. Perhaps you remember what Professor Jones has told you, and perhaps you don't. Perhaps you have read my papers, and perhaps you have not. That does not matter. Now then! In a series of tests made by the Government some years ago for the purpose of determining the adaptability of timbers to certain uses, it was found that the rock maple of Vermont contains a higher percentage of moisture than the rock maple of any other state. From a series of tests made partly by the Department of Agriculture and partly by independent investigators, and comprising more than three thousand analyses, it has been found that the sap of the maple trees of Vermont contains a higher percentage of sugar than that of any other state where tests were made. So that, the Vermont maple sugar maker has the advantage over all competitors in these two particulars:—His sap is relatively richer in sugar content, and he has comparatively more of it stored in his trees.

But, the amount of sap that a tree will yield is directly dependent upon the weather during the so-called sugar season. Ideal weather consists, as you know, of bright sunny days, during which the temperature rises to sixty or seventy degrees, followed by clear, cold nights during which the mercury reaches pretty nearly to the zero mark, with a storm, either of rain or snow at frequent intervals. I do not need to enlarge upon this point for you know what constitutes ideal sugar weather as well as I. Such weather can continue for any length of time, only during the period of transition from winter into summer. And wherever

that transition occupies the greatest length of time, will be the greatest number of days of ideal sugar weather. And that period is longer right here in the Green Mountains, and in their continuation in Quebec than in any other part of the world. And for this reason, in addition to those I have named, we ought to stand pre-eminently above every other state in the quantity of maple sugar that we produce.

But we don't do it. We are way behind all others. And, in proof of this statement I will submit the following table which I have compiled and arranged from tables 115, 116 and 117 of the last Census. I am sorry that later statistics are not available, but there are none, except in Vermont and Ohio, and these do not cover sufficient territory to answer for my purpose. Maple sugar is made, commercially, in nineteen different states, and the total amount, including the sugar equivalent of the syrup, is, in round numbers, 47,000,000 pounds. But of this amount 40,000,000 pounds, or more than eighty-seven per cent were produced in the five states of Vermont, New York, Ohio, Pennsylvania and Michigan. Hence I have included only these states in the table. In the original tables the first merely gives the number of trees tapped; the second gives the number of pounds of sugar made, and the third, the number of gallons of syrup produced. It thus becomes necessary to combine the tables, and to calculate the sugar equivalent of the syrup. In making this calculation, I have assumed that the sugar equivalent of a gallon of syrup is eight pounds. It may make more and it may make less, according to the density to which it is boiled, but eight pounds is a fair equivalent. Upon this basis we have the following table:—

	No. of Trees.	Pounds of Sugar.	Pounds per Tree.
United States,	18,899,533	46,899,533	2.53
Vermont,	5,585,632	11,006,241	1.96
New York,	4,948,784	11,106,236	2.24
Ohio,	3,170,828	10,845,400	2.95
Michigan,	986,737	2,446,045	2.58
Pennsylvania,	1,298,005	4,317,500	3.48

Thus it will be seen that Vermont produces half a pound of sugar per tree less than the average of the United States, a pound less than the average of Ohio, and one and one-half pounds per tree less than the average of Pennsylvania. Thus this table does not afford very comforting reading to us old Vermonters who have bragged for so many years about the superiority of our native state

as a maple sugar producing state. And a further study of the table is even less consoling, for it shows, that, while we tap thirty per cent of all the trees tapped in the United States, we produce but twenty-three per cent of the sugar. From the natural conditions of these five states, we would reasonably expect them to be classed in the order of the production per tree, about as follows:—Vermont, New York, Michigan, Ohio, and Pennsylvania. Instead, the order is reversed.

Now there is a reason for this. And it can only be in the different methods of manufacture practised in the different states. We, here in Vermont have a deep-rooted conviction that our ways and methods are the best in the world, and we have settled down into the same old ruts that our fathers made, and we refuse to get out of them. I have shown you that Ohio makes a pound of sugar per tree more than we make. How do they do it? A few years ago we had a maple sugar maker from Ohio to tell us of Ohio methods. Among other things he told us that the Ohio maple sugar maker hangs two buckets to a tree if the tree is two feet or more in diameter, and that, along towards the close of the season when the sap flow begins to slacken, he makes an extra tap-hole, a few inches from the first, and inserts an extra spout. So much for Ohio.

But Pennsylvania beats Ohio by half a pound per tree. I hoped and expected that a sugar maker from Pennsylvania would be here to tell us of the methods employed in that state, but he disappointed me. However, I have investigated their methods, to some extent, myself. And I want to tell you that those sturdy old Dutchmen, who used to carry their grain to mill on a horse's back, with a stone in one end of the bag to balance it, have not yet caught on to our Yankee method of lessening the labor cost of making maple sugar, by decreasing the flow of sap. They do not make as choice a grade of maple sugar as our Vermont sugar will average. In fact, they do not try. They are after the money there is in the business. On the other hand, I doubt if any of them make as low a grade as some of our Vermont maple sugar makers produce. But they do make a grade of sugar that commands just as high a price when sold to the blenders, who, by the way take eighty per cent of Vermont's products. And the more I study the problems of maple sugar making, the more thoroughly convinced I become that the money for the average maple sugar maker of Vermont, who takes up sugar making as a side line, is right in this direction.

But let that pass. The Pennsylvanian sugar maker

taps with a rather large bit. That is, with one from half an inch to five-eighths of an inch in diameter. We use one of half an inch or less in diameter and insist that a tap-hole of that size will yield just as much sap as one much larger. Perhaps it will. I believe it will, and have argued many times to that effect. But, owing to the individuality of the trees it is a point that is pretty hard to determine, positively. But never mind that point. The Pennsylvania sugar maker makes two tap-holes, some five or six inches apart, and drives two spouts for every bucket. I have talked with a good many practical sugar makers, and recommended this method of tapping, but every one has either told me that it would not increase the yield to any appreciable extent, or has said to himself that I did not know what I was talking about. The truth of the matter is too easily demonstrated to merit a discussion at this time, and I am just going to ask you to try it out. Tap a dozen, or twenty or fifty trees with one tap-hole on one side and two on the other and see whether or not there is any difference in the amount of sap in the two buckets. That will tell the story. I have tried it and I know.

Then the Pennsylvania maple sugar maker hangs two or more buckets to every tree that is more than sixteen inches in diameter. They plan to so surround the larger trees that the buckets shall stand two feet apart. Now I know that the great majority of sugar makers will hold up their hands in holy horror at this idea, and say that such severe tapping will surely kill the tree. Well, suppose it does. Haven't you sugar makers got gumption enough about you to plant others? And, besides, are you not praying God to kill the trees so you will have an excuse to cut them, and thus have a further excuse for not making maple sugar? And are you not cutting them anyway, just as fast as you can hire men to cut them? And is not the Fuel Commission urging you at the top of its voice to speed up and cut them faster and to cut more of them? But I tell you that tapping your trees, no matter how heavily you tap them, will not hurt them. We had a man talking to us a few years ago who had hung as many as twenty buckets to some of his trees, and he found that the trees suffered no injury. The fact is, that the sap is forced out by an internal pressure. And before a tree can yield sap enough to lower its vitality in the least, the pressure will be released and the sap will cease to flow in profitable quantities. The Ohio maple sugar makers calculate that they get three pounds of sugar, annually, for every cord of wood that their trees contain. The Pennsylvania sugar maker

gets a good deal more. We get a good deal less. But figuring upon that basis. Three pounds of sugar means but ninety pounds of sap. A cord of maple wood, in April, contains between thirty-six hundred, and four thousand pounds of sap. What is the ratio? Less than one to forty. It amounts to no more than a cat-scratch on your hand. And so I say, Tap your trees heavily. The more buckets you hang, the more tap-holes you make, the more sap your trees will yield, and the more sugar you can make per tree. But the yield will be in an ever decreasing ratio, and the time will come when the increased yield will not be sufficient to repay the extra cost of tapping, and of attending to the extra buckets. But tap them to the limit of profit.

And there is another point. The Pennsylvania sugar maker uses buckets of sufficient capacity to hold all the sap that the trees yield from one gathering-time until the next. And he saves all that flows. We use buckets of only twelve or fourteen, or, possibly, sixteen quarts, and, in a good run of sap, we find half of them running over, and the sap wasting on the ground. I have been in sugar orchards at five o'clock in the afternoon, and found buckets from which the sap had been gathered that morning, full to the brim, and all the sap that flowed from then until the gathering team made its next round would be lost. We complain that our trees do not yield enough sap to make sugar making profitable, but, with our little two-for-a-cent buckets, we do not save what the trees do yield.

And there is just one more point. The Pennsylvania maple sugar maker still uses the semi-circular sheet iron spouts that are driven into the bark just below the tap-hole. These are just the kind that we used fifty years ago, before C. C. Post and a host of other inventors advertised the fact that a tubular spout driven into the tap-hole would force a tree to yield double the quantity of sap, and we believed the stuff, just because we saw it so many times in print. Now I am not going to discuss this point. But what I am going to say is this. The Pennsylvania sugar maker uses spouts of this type, and, because he does use such spouts, he is able to use a reamer. And he does use a reamer. After every run of sap he reams out the tap-holes, just as religiously as he says his prayers. And, whether his prayers are answered or not, his trees respond generously to the reaming. Reamers were formerly used almost universally in this state. And we always got an increased flow of sap. But the reamers would get dull and that made it hard work. And so we, and more especially the boys and the hired men, began to use them less efficiently, and then they be-

gan to be less effective. And then they became unpopular. And when the new spouts came, that capped the climax, and the reamers were discarded.

Now I have talked a long time, and I have told you some unpleasant truths, and I am going to stop. I am not going to discuss the respective merits of the two methods any further. It may be that the Vermont method is far the best. And it may be that the Pennsylvania method is all wrong. I will leave that to your decision. But the fact remains that the Pennsylvania maple sugar maker gets the sugar, while the Vermont maple sugar maker does not.

PRES. CHAPIN:—It is a little out of the ordinary course to present the report of the secretary at this time, but since it appears on the program, and since we now have a few minutes' time, we will listen to the report of the secretary, Mr. Ormsbee.

REPORT OF THE SECRETARY.

I have only to report that the past season has been the most prosperous for this Association of any in its history. Our meetings have been well attended, the papers well and favorably received, and the demand for our Reports has been unusually large. We have received twenty new members and fifty who had formerly been affiliated with the Association, but who had allowed their membership to lapse through non-payment of their annual dues have rejoined. The paid in advance membership, is, I believe, the largest now of any time in the history of the Association. Most of those who have joined the Association during the past year, are practical maple sugar makers, and have become affiliated with the Association through the personal solicitation of the Secretary. Yet there is much more to be done along this line, for the membership now represents but one-twentieth part of the actual number of maple sugar makers in the state. This is a work for each and every one of you. Every new member adds strength and influence to the Association, and it is your duty to induce your neighbor sugar makers to unite with us.

And it has also been the most profitable of any previous year to the maple sugar makers in general. Help has been scarce and high-priced. But maple sugar has also sold for higher figures than ever before. In 1892, when this Association first began its work, and when farm labor was worth twenty dollars a month, and maple sugar sold for five cents a pound, it was up-hill work to make a profit at the maple sugar business. Yet farmers did it even then. But now, with labor worth but forty dollars a month, and sugar selling for above twenty cents a pound, the condition is reversed. Much of this rise in price has been due to the influence of this Association even with its small membership. But much more remains to be done. Twenty-three per cent of all the maple sugar manufactured in the United States, is made right here in little old Vermont. But ninety per cent of all the maple sugar sold to the ultimate consumer is sold as Vermont maple sugar. In the matter of dairy products the farmer receives within a small margin of what the ultimate consumer pays. In the matter of

maple sugar products, there is a margin of one hundred and fifty per cent. This is a condition of affairs that ought to be remedied, and the Vermont Maple Sugar Makers' Association can remedy it if you will give us the strength with which to do it. Multiply our membership by ten, and we can place the price of maple sugar on the farm to double its present abnormal price, and keep it there.

According to the best estimates the total output of maple sugar in this state amounted to closely around 13,000,000 pounds. The average price received by the farmers was closely around twenty cents a pound. Thus this industry returned to the farmers of this state an aggregate of more than 2,500,000 dollars. From the figures returned by the listers in the different towns, it is known that only one-half of the available maple trees are utilized. Were the maple sugar industry developed to its fullest extent it would mean that another 2,500,000 dollars would be available for distribution among the farmers in the state, or an average of \$10,000 among the farmers in each town. Is not that worth working for?

But it is important to know just where we are at. It is important to know whether we are progressing or receding. With this in mind I presented a resolution to this Association in 1913, asking the Association to use its influence in securing the enactment of a law requiring the listers to collect certain statistics regarding the maple sugar industry. These statistics were to be returned to the town clerks, who were to transmit them to the Secretary of State, where they were to be tabulated and ultimately published in the Report of the Commissioner of Agriculture. The resolution was adopted and we carried the resolution to the dairymen to get their assistance. They introduced some additions and passed it to the Commissioner of Agriculture, Mr. Martin, who is now Secretary of the Dairymen's Association, and a bill was drawn, and, through his influence it became a law, and, for a number of years we had accurate statistics of the industry, and we knew just what we were doing.

At the last session of the Legislature, a little one-horse representative, of a little one-horse town attempted to do something smart by introducing a bill to repeal this law. I went before the Committees, and was instrumental in preventing the actual repeal of the law, but it was hashed over and re-hashed and finally so amended, that, while the listers are supposed to collect these statistics, there is no provision for transmitting them, or tabulating them or publishing them, and they are now in the offices of the various

town clerks, where they will remain until the end of the five years stipulated by the General Statutes, when they will be destroyed.

I bring this matter up at this time and suggest that the Association as a body, take some action tending towards the enactment of a law requiring the tabulation and publication of those statistics, and also towards the restoration of the original law.

TUESDAY AFTERNOON SESSION.

ORGANIZATION AND CO-OPERATION.

C. A. BADGER, EAST MONTPELIER.

Mr. Chairman, Ladies and Gentlemen:—

For the last 16 years I have met with you and every year until this I have brought a sample of butter or sugar or both. This year I had nothing to bring and to punish me, I expect, they have asked me to "stand on the floor." Next year I assure you I will bring some exhibit, and in that manner save you the hardship of listening to me.

Organization and Co-operation is a large subject for anyone to handle and particularly me. The subject has about as many sides as a box and a box, you know, has 4 sides around it, the top and the bottom, the inside and the out, making 8. I am not going to try to explain all those different sides, but will cut the number down somewhat.

Nearly all trades are organized—organized to the limit—and some of them carry the thing too far and that makes a monopoly or trust. Organization cannot go a great ways without Co-operation. I would not advise anyone to organize unless there is something to organize for and something for that organization to do. In order to carry organization out you must have co-operation and you can not very well have co-operation unless you have an organization to tie to. Nearly every trade is organized except the farmers. Why don't the farmers organize? You have heard it said frequently that it is for lack of leaders. I don't agree. I think the farmers have just as good men for leaders as any other class; sometimes I think they are better. A prosperous farmer has got to be an all-round man; he has got to have a good level business head; he has got to understand things and have a broad liberal mind. We have many of those men in our farm organizations. I think the chief reason why farmers do not organize is because of a situation such as we have in Washington County where we have a farm bureau. It works out about like this: we have about 1500 good farms in Washington County. We have farm owners to the number of 2500

but a portion of them just barely stay on the farm; they grow poorer every year their buildings and fences are running down. Of the 1500 good farmers in our county, about 500 belong to the Washington farm county bureau and nearly that number to the Washington County Farmers' Exchange. The other thousand—and it is hard to tell about them. They seem to be self-satisfied and take too little interest outside themselves. It is a difficult matter to deal with a self-satisfied man; you get along-side him and try to put up an argument with him, he will agree with you on every point, you leave him and he will forget what you have said. Once in a while one of them will come over but there are many of them that are self-satisfied—that are stumbling blocks to the whole proposition. It is a fact that farmers must organize or go out of business. We have trusts, jobbers, brokers and everything else to fight and the labor trust is the biggest and the most difficult proposition that we have to get along with. It is the hardest one we are up against at present and the hardest one we are going to come up against in the next two years.

In our county we have a farmers' exchange that has been organized a little better than a year. It has been a hard year to work out such a proposition and we have been up against almost everything but have done in a year's time a little better than \$25,000 worth of business, which has been done at a cost of \$800—a three per cent margin. That is not all we have done,—we have kept down prices throughout our county and have helped the farmers along that line. To illustrate,—last spring when corn meal was worth about \$80 a ton, we sent a carload into a locality where they were selling for little better than \$80. We placed a carload in there at \$60 a ton. That same day corn meal dropped in that locality to nearly our price. It has worked out that way all along the line. The dealers have found out that when they get above such a price the farmers will turn to us for their feed and if it does go above such a price we do handle it, and handle it for the benefit of the farmers.

We are selling maple syrup at the present time through a Providence, Rhode Island, Exchange. The producer turns his syrup over to us and we are getting for him \$3.25 a gallon.

We are going to have a few certified seed potatoes, not as many as we expected last fall because of the fact that the rust and the late blight hit certain fields that we had counted on. There is a great demand for seed potatoes in the south and it would be a splendid idea for the farmers of Vermont to make a specialty of raising seed potatoes.

The Maple Sugar Makers' Association has been in existence about 26 years and at the present time 20 per cent of the maple sugar produced in this country is made in the State of Vermont and about 80 per cent of the entire product in the country is sold as pure Vermont maple syrup. Looking at it from a business point of view it seems as if something is wrong here and that the Vermont Maple Sugar Makers' Association ought to get onto their job and see to it that the maple sugar product made out of the state is not sold as pure Vermont maple sugar and syrup.

I think this could be handled all right through the different exchanges if you had faith in the exchange and would be willing to hold the goods until later in the season and not turn them all onto the market in the spring of the year. There are a good many of you who have regular customers and get probably all your goods are worth. A large percentage of the maple product is thrown upon the market early in the season and those who send their products to the commission merchants have to take whatever they see fit to send. The producer has no control over the price; there is no established price. It looks to me as though one well paid man (and it will take a good man to do it) to look after that end of the game and to co-operate with a farmers' exchange could accomplish much. I know if a man wishes to keep back his products until late in the season there would be no trouble in his getting 75 or 80 per cent of the value of his money for these goods. I believe if you have the right kind of a man to look after this matter and at the same time look after the matter of advertising the maple products of Vermont, much progress can be made. The Ohio sugar ought not to be branded as a Vermont product; New York state should stand for its own product, and we should not have the benefit of it—if it is a benefit. I should recommend to the Sugar Makers' Association that they act as an association in this matter. I would also advise that the Sugar Makers' Association advertise to a greater extent; I don't think there is a third of the farmers that knew about this meeting here from anything that has appeared in the papers or any notice that has been given. I would recommend that the report of this meeting be in the hands of every member in the course of a month or 6 weeks so to be read before the next season's crop comes on. I think we could use this report to better advantage then than a year after the meeting.

One thing that has been of interest to us in our exchange and that has worked nicely is the note system. Last

spring when we started out we did not know what we were up against. It was all new to us. We had a lot of orders for chemicals, fertilizers, feeds, seeds, etc. One morning I received word from Montpelier that there were drafts for between \$7000 and \$8000 for material that had come in and must be unloaded in 2 days. No provision had been made for paying for it but we did not pay demurrage on that stuff even though it took some hustling to bring it about. That occasion gave us an idea that something had got to be done about financing the matter. We arranged with the different banks in the county for a note system. As it is to-day when a man gives an order he signs a note. If he wants to pay that note when he gets the goods he may do so. It is written on demand, or if he wishes he may let it run for 30, 60 or 90 days and make it in three payments. We turned over a list of the names of the farmers to the bank and they went over the list and marked the standing of each individual. The man who is marked "slow" or "doubtful" is requested to get someone who is good to sign with him or make his own arrangements with the bank before we will accept his note. In that way no one is under any obligation to anyone else. No one is on anyone else's paper and in this way the association or exchange is protected. This proposition has worked out finely. Upon the arrival of a car the drafts and notes are put into the bank to raise money to pay that draft and when the parties come for the goods they can pay cash or they can pay in 30, 60 or 90 days, according to the way the note is made out.

On our cotton seed, it takes about 2 months to get a car here from Baltimore. If a man ordered 1 or 2 tons and was obliged to send cash with the order he would be out that amount of money that length of time. This note system has proved very beneficial to the farmers. We have unloaded something like a dozen carloads of feed and have 5 or 6 more carloads on the way.

Afternoon adjournment.

GLASS AS A PACKAGE FOR MAPLE SYRUP.

VICTOR I. SPEAR, RANDOLPH.

Mr. Chairman, Ladies and Gentlemen:—

When the Secretary wrote asking me to take the subject of "Glass as a package for Maple Syrup," I replied that I was not very sure that I would advise or advocate that kind of a package but if he wanted I should talk about it and say what its advantages were as far as I had experience I was willing to do it.

In the packing of goods whether maple or otherwise I believe the producer should first study the demands of the market where he is going to dispose of his product. It is not for the producer to say whether he shall put his syrup in glass or tin or his sugar in tin or wood, it is the duty of the producer to put his goods in packages and in the form that the customer wants it. That is and should be the guiding principle of the producer if he is to hold his trade and to satisfy his customers. In a general way, in selecting packages for your goods there are two or three things you ought to consider. You should consider first the safety of the goods, the probability that the goods are going to reach your customers in good condition, that they are not going to be damaged by the freight handlers on the way and second that the goods are not going to deteriorate in value before they reach their destination.

As between glass and tin in this connection I believe tin rather has the advantage. The glass package is an attractive package for the shelves of the grocer. There is no package in which goods will show to so good advantage as in glass, especially if you have a fine quality of goods. On the other hand if you have a rather poor quality I don't believe the glass package would be advisable under any circumstances. These are some of the advantages which you have in glass. On the other hand there are some disadvantages. The glass package is the most difficult to get to your customer without being damaged. We have tried a good many ways of packing glass (as we put a good deal of our goods in glass, some of our customers and our largest grocers taking nothing but glass.) When we deliver the

glass package to the railroad it always goes with a hope that it may reach the customer without being broken.

There are a great many ways of packing glass but to give a method and warrant it free from breakage I am not able to do. I don't know of any way you can pack glass, or in fact tin, but what the science of the freight handlers will prove too much for us. You may pack your glass in a crate, using all the precaution at your command, and if the freight handler drops it for a distance of 10 feet to the platform the probabilities are some of the contents of the packages will be broken. There is no difficulty in packing it for safe arrival if the packages are handled decently and fairly. We do our packing now very largely in barrels, believing we get less breakage in that way than in any other style we have tried. The bottles are securely wrapped in paper, then packed in sawdust fine enough so that it will form a good bed, and with any ordinary treatment there will be no breakage.

There is another risk we take in the glass package: unless you are very careful about the use of corks you will have trouble, you are more likely to get air into the package than with a good tin can. There are various kinds of corks you can secure. Some of these are of such loose grain that air will get through them and reach the product. If you are using glass you should be very careful as to the kind of cork you purchase. If you allow air to come in contact with your syrup you will have a poor product when it reaches the customer.

There is another disadvantage of the glass package over the tin. Glass will cost you more to buy and will cost you more to deliver to your customer. The glass package takes the first class rate while the tin takes second or third. We estimate that it costs just about double to ship our goods in glass as compared with tin. It does not matter to the producer, of course, how much freight is paid providing the fellow at the other end pays it but if you have the freight to pay that is a matter for you to consider.

I must say that my own preference is in favor of the tin package on account of its greater safety, cheaper transportation and less liability that the contents will be damaged. But that is a matter that should rest between you and your customer and if your customer wants glass don't argue with him, don't have any discussion with him but do the best you can and put your glass in the best form you can for shipping, hoping it may reach him safely and thus undertake to please him. I don't believe any of us will make any progress in the long run in undertaking to

educate our customers as to what they want; they may change their mind after a while and it is much better for us to comply with the demands that are made upon us than it is to undertake to bring people to our way of thinking.

A word in regard to the maple sugar condition to-day. I believe we are rather in an uncertain position at this time as to the outlook both for the crop and as to price for another season. The past year we have had unusual conditions. Great shortage of cane sugar has increased the demand for maple in a great many directions. I suppose every dealer in Vermont is practically out of business—I know we are and have been for many weeks. This is not due to any particular push we have put into the business but it has come about almost entirely because of the demand to supply the shortage of cane sugar with maple goods. We are not going to have that demand this year; probably cane sugar will be supplied as far as it is needed. People are going to object to paying the extreme high price that they have paid the last year when they can get cane sugar at present prices. This condition is one of our problems for the future. I don't know how it is going to turn out,—I don't suppose any one does, but undoubtedly the conclusion would be that a great many people will use cane sugar instead of maple goods if the maple is too expensive. On the other hand, there is a certain class of trade—we all have it,—that will take about so much maple no matter what the price is. I suppose to-day a good many customers if we were to say we had to have \$5.00 a gallon for syrup, would say to send it along just the same and we should sell some. But the large class of consumers will stop and look at the price and I have an idea they will limit their consumption of this product according to the price.

There is nothing in this talk of mine to discourage people from doing all they can with the maple business this coming spring. The price is bound to be good but just how good I am unable to say.

At the close of Mr. Spear's talk Secretary Ormsbee gave a demonstration of packing glass bottles.

MR. ORMSBEE:—I want to supplement this talk by Mr. Spear. As he says there are a good many disadvantages connected with the use of glass as a package for maple syrup. At the same time there are some advantages, and, if you have a trade that calls for glass packages, you must

furnish them or hunt for other customers. Maple syrup in clean, clear glass bottles presents a far more attractive appearance in a grocery window than if in a package of any other kind. And it sells more readily, and at a higher price. And many of the leading grocers who buy in tin cans, re-pack it in glass, and the question is, Can you furnish it in glass for less money than they can re-pack? If you can do so, the great demand in the near future will be for glass packages.

But the bottles must be small. Pints and half pints are in the greatest demand, with an occasional call for quarts. The demand for glass packages comes from the residents of the smaller flats and apartment houses, in the larger cities, who buy only one day's supply of provisions at a time and they require maple syrup only in quantities sufficient for one meal. Your customers who buy a year's supply in the spring and store it until wanted, would undoubtedly prefer it in smaller, glass packages, but I doubt if many would be willing to pay the extra price. However, that is between you and them. Maple syrup in rectangular bottles, like those you see on the tables, presents the most attractive appearance, and, no doubt would sell more readily. At the same time, for reasons that it is not necessary to describe at length, those bottles are the weakest of all styles, and are not to be recommended for any but the most careful handling. The ordinary type of milk bottle is the strongest type that can be made, and the nearer you get to this pattern the more abuse your bottles will stand when being shipped.

Just how safely syrup in glass may be shipped, is a question of packing for transportation. Manufacturers of patent medicines ship millions of bottles of liquids with never a breakage, and you can do the same. They have worked out a perfect system of packing, and you can follow it. They pack them, first, in small collapsible cartons made of thick, corrugated paper made to exact sizes, this that I am showing you is made to hold six, half-pint bottles. It is divided into six compartments by sections also made of thick, corrugated paper made to exact sizes, thus holding the bottles firmly in a tightly fitting, elastic cushion. Then the ends are brought over and interlocked, and the cartons are packed in boxes of suitable size, and made in proportions that will just fit the cartons. This that I am showing you will just hold six cartons if tightly packed, giving no room for movement, but holding each carton securely, and thus strengthening the elastic cushion surrounding the bottles. Such a box will hold nine quarts of

syrup, and will weigh, when filled, rather more than forty pounds, which is heavy enough for shipment. It is the heavy packages that get the rough usage. The cost of boxes of this size at the factory is \$2.25 a dozen, or a little more than eighteen cents each. The cost of the cartons is a fraction over seven cents each, so that the entire cost of packages, exclusive of the cost of the bottles, is in the vicinity of seven cents per quart. I am not informed, just at the present time of the comparative cost of the bottles.

Now I want to speak about putting the syrup in the bottles. Syrup can be kept indefinitely in glass, and I believe that glass is even a better package for long storage than tin. But one must take a little more pains. First the bottles must be clean. Then they must be sterilized. This can most conveniently be done by scalding with boiling water immediately before filling. But be sure that the bottles are thoroughly dried before filling, for just a few drops of water adhering to the container, will, in long storage, cause the syrup to deteriorate to a greater or less extent. Then heat the syrup. It is better to bring it to a boil and to pour it into the containers at a temperature above 160 degrees. But the one thing to be remembered is that it must be poured into the containers at as high temperature as that to which it will ever be exposed during storage. Otherwise, when heated while in storage, it will expand a trifle, and unpleasant consequences of some kind will follow. Fill the bottle to where the cork will reach. Then force a darning-needle, or an awl of similar size through the center of the cork. Dip the cork in brandy and then crowd it down snug upon the syrup, withdrawing the needle to allow the compressed air to escape. And seal the bottle immediately. Paraffine wax is a convenient sealing agent, and bottles so sealed and tied with a blue ribbon, like those on the tables present a more attractive appearance. But a home-made wax, made by melting together about equal parts of lard, tallow and rosin makes a good deal better sealing material. Apply this at a temperature high enough to make it soft, and be sure and use enough to thoroughly cover the cork.

Syrup so canned may be kept indefinitely. Not long ago I tasted some that had been so bottled and kept for sixty years. A man had put up several gallons of syrup when his daughter was born, declaring that it should not be opened until her wedding day. He died, but the daughter religiously kept the syrup until her sixtieth birthday, when she became discouraged and opened the bottles. I tasted the syrup and it was in perfect condition.

THURSDAY FORENOON SESSION.

THE HOME MARKET.

MRS. MARY L. ANDREWS, DORSET.

Great was my surprise at receiving an invitation from your Secretary to be present at the meeting of the Sugar Makers' Association and deliver a paper. I surely feel it is an honor to be asked, as this is a gathering of men long experienced in making and marketing of maple products.

As I have not had an occasion to write or read a paper since my graduation from Normal fourteen years ago I certainly felt at first this was an impossibility. In the past years had I been a member of the Grange as most of you present probably are I surely would have had experience in this line.

Born and brought up on a Vermont farm of course I have always been interested in the process of making maple syrup and sugar in the spring. I pity all those who have never been fortunate enough to at least have visited a sugar camp; they have missed much pleasure of life I feel sure you will all agree.

My subject has to deal with the "Home Market." As I shall only take this up along the line of candy making I think it quite improbable that the men present will be even interested in what I have to say for though most men I find are generally ready to consume a quantity of candy not one among you would desire to make it or have the patience required to do so. It surely requires the greatest patience. However, if you will be willing to listen for a short time you may return home after these meetings and carry to your wives, daughters, or sisters some item of interest which may later prove profitable to them. The making of maple candy is not a new means of disposing of one's supply of syrup at higher prices than in any other way. I know of some instances where parties have made it for a number of years. At the present time it is becoming quite a business among women of Vermont, even spreading to other states in New England I find. As to the Western States I do not know if they have gotten hold of this idea yet.

I am told that there is a candy shop in St. Johnsbury whose owners are manufacturing over a hundred assortments of the maple product with Jersey cream, chocolate and nuts packed in boxes ranging in price from 20c to \$5.00. In our locality, I can count up fifteen others making and selling maple candy at their door within a radius of twenty miles. One almost wonders how all find customers. But we all know the people of the United States consume a surprisingly great quantity of candy every year and so many would consider maple candy a most delicious confection and prefer it to any other, if it could be obtained readily. And how much more profitable the farmers' sugar crop would be if their syrup could be made into this pure, delicious candy.

My success or yours in the manufacture of candy will never be great financially as long as we must make it in small quantities by hand, and dispose of it here and there as we can.

My profit cannot be as great as others who own their orchards and make their syrup for I am not fortunate enough to possess a maple tree and must buy all my syrup and pay the usual price per gallon.

Four years ago I returned to Vermont to make my home after having lived in Connecticut nine years. Desiring something to do which would both occupy my time and be profitable I began to look about. Making candy surely was farthest from my thoughts. That spring a young woman I knew told me she was going into this business—I laughed and said she would never find a sale as so many others were already making it. That fall I asked her what luck she had had and she replied “try it yourself if you want a good thing.” I thought she was joking and gave it little more thought that winter. But when spring came I began to think seriously about trying it. So on July first, three years ago, I brought out on our lawn as attractive a sign as I could design and one entirely different from the others, I know I was fortunate in being located on a main road for automobile traffic besides being in a town which is a summer resort and six miles from another summer resort, Manchester, where the well known Equinox Hotel is located. People stopping at my door carry home to their friends a taste and from them I receive mail orders and in this way my trade spreads. The first month I started in I was disappointed in my sales as I had anticipated getting rich quick as it was reported others were doing. But I kept up my courage and in another month was quite pleased with my returns. Last summer I had

double my business and this past summer had three times as much. So you see my business has grown rapidly until now I find almost difficulty in supplying the demand. Now I am having mail orders almost constantly.

Christmas, the week previous, I made and shipped one hundred and forty pounds—one customer alone ordering forty pounds sent out as Christmas gifts. These orders were sent to many states—Florida, Texas, Virginia, Minnesota, and Ohio being among them.

I know of no line of business where as small an investment will bring as great profit and as little chance of loss, as maple syrup is always salable.

Don't think for a moment candy making is an easy job—as well as a profitable one for I assure you it means hard work and long hours if one makes it a success.

There are several points governing one's success which I wish to mention. The most important of these being the quality of the syrup you use. Unless you make an A No. 1—first quality syrup or can buy it don't try candy making for I am confident it will not prove real saleable. I am most particular about my syrup, flavor and color. Probably some of the men I buy from would tell you I was fussy.

Next I would consider the quantity. By this I mean if you are selling pound or half pound boxes be certain it weighs either sixteen or eight ounces. It seems to be a favorite method of some makers to use a considerable amount of crumpled paper in their boxes. This also detracts from the appearance of their article. Better cheat yourself than someone else as it pays in the end if you are desirous of making another sale to the same customer. I have little patience with the person who is always weighing and measuring his goods for fear he will be over generous. I see to it that my pound boxes are filled full even if they weigh more than 16 ounces. Often when I weigh them for my own satisfaction I find they contain two or three ounces over the pound. Do I take it out? No, never. I may be out the price of a few gallons of syrup during the year but I feel sure I have gained trade.

My third point is never to sell a failure to a customer. You are sure to make them, I do quite often and keep the family and myself sweetened up on these so they are not a total loss. It is easy enough for one to say "I'll never see this person again and probably he won't know the difference." Now don't fool yourself that way. Often I have parties who will go out to their car and sit right there and eat their candy and not infrequently come back and buy more. I remember a man coming in and ordering ten

pounds after having sampled it well before leaving my lawn. Many of my customers return another year. I have a New York doctor who stops each season now on a trip north and gives me a big order. Do you think these people would come a second time had I sold them a pound which I knew was not perfect? If I buy a box of Huyler's and find it poor, what do I say? Any more reason that I should put on the market a failure in maple candy? And would I not be cheating to take someone's money for a poor article?

Your failures may be of various sorts. You may have cooked your candy too much and consequently it is hard, or not enough and it becomes sticky, or it may not be fresh. Customers most always ask "is it fresh?" Sometimes they will ask to sample it as they have been fooled elsewhere.

I am going to give you a few instances of other people's failures which have been told me by their customers—later mine—A year ago an automobile party stopped at my place and asked "may we look at your candy? We do not want to buy as we have a large quantity on hand but we want to see if you all make the same kind." Then they showed me their purchase and told me where they bought it—also asked what they could possibly do with it—I suggested that perhaps they could melt it. Honestly, it was just like a rock—either cooked many degrees too hard or was many weeks old.

A while ago a farmer in our town who in years past had made some of the best syrup in our locality came and wanted to buy just a small amount of candy as a sample. He told me that he had recently had some of another maker which he had returned to her and told her that perhaps she thought he didn't know good maple sugar but he would suggest that she use the returned box as a foundation for a house. Later he ordered several boxes of me sent to friends and I rather prided myself on having been able to please a particular old bachelor.

Very recently a woman told me how pleased her friends were with the candy I had just shipped them. Then she told me how disappointed they were over some they bought of another party to carry home with them and on their arrival found it tasted strongly of kerosene. Could you imagine anything worse? It would be well to sample each pound of candy one makes—I believe large candy manufacturers always have their candy tested before it leaves the factory.

When I tell the family that this or that pound of candy I have made is too hard or too soft or something else the

matter with it, they say I am fussy and too particular. I often set aside a pound that for some reason does not satisfy me.

If you must sell failures do label them as such and have a bargain counter for them—though I would not advise this even. If I have related to you the failures of other candy makers it has not been to criticize them but it is that you and I may profit by their mistakes. I consider that if a thing is worth doing at all it is worth doing well and it is one great means by which we shall reach success financially and to our own satisfaction.

I would suggest that you should make it a point always to accommodate your customers and fill their orders promptly even though it inconveniences you. You all know your own feeling when you have sent an order to a firm and wait weeks perhaps before receiving the goods. A woman told me last spring that she had been sending a party orders for candy right along—at first she received it promptly but after a time she would have to wait two weeks before her orders were filled and it resulted in the young woman losing her trade entirely.

Once this last summer after a very full day, I was so weary by five o'clock that I made the remark that no matter what happened or who came I absolutely drew the line at making another pound of candy after seven that night. Almost directly a car drove up—the gentleman gave me his name and said he thought his brother had had candy of me—and would I fill an order for 10 pounds for him and have it at a certain hotel seven miles distant by eight o'clock the next morning? They had a car but for some reason could neither come or send for it. I thought a minute and then said "yes, I will take the order." I did not feel equal to making one pound at the time and it took me long into the night to make and pack, but do you think it paid? On their return to New York they soon sent an order for another ten pounds—Thanksgiving they had 10 pounds more and again at Christmas.

By my effort to accommodate them at that time I have gained a good customer. Christmas many of my orders came in very late—up to the day before even—but in each case they were desirous of immediate shipment. This was only possible by my working very late at night. One woman in Washington realized her order was sent late but would appreciate it if I could possibly get it to her in season. I put in some extra time and was able the following day to send it.

One must see that her candy is put up in an attractive way—also try to have your place of sale inviting—of course it is not necessary to speak of your own personal appearance, you would expect to be neat and trim. We have a large old-fashioned house which is thrown open to all and one may stop and rest even if he likes. Two rooms I give up entirely to my business—one might be called a reception hall. Here I have a book in which I ask each one to register—if he is willing. They seem to like this idea and I find it most interesting to see where all these travelers come from. Last summer I had tourists who registered from Florida, California, and Oregon even. Then I have a very cheerful sunny candy kitchen and one is welcome if in no haste and interested.

If one is not in a good location for selling candy at his door as I am, a "home market" could be worked up I am sure by advertising in a first class magazine or paper or by procuring names and addresses of people from your friends and acquaintances and sending out samples.

Here let me say that in shipping candy by parcel post you cannot be too particular about the matter of packing as it breaks easily and people do not of course care to spend their money for anything which will arrive in a badly damaged condition. I want to speak of boxes—the other makers and myself all use these cheap boxes—I say cheap—they cost \$18.00 per thousand plain, more if you wish your name and address printed. Fancy boxes would be very expensive and not necessary in cases where one sells at the door. One can have a neat card with his name and address and price list of various kinds of candy made to slip inside each box. This can be easily removed and saved for the customers' future use,—then the box can be thrown away. I use a rubber stamp at present though another year intend using cards and envelopes, letter heads and bill heads with name and address. An original name given to your particular brand of candy will prove attractive and a means of advertising.

Now I have gone into details as to how one should sell candy but I have not told you how to make it. I take it for granted that most of the Vermont farmers know considerable about making maple sugar. This is not so very different. Mr. Ormsbee asked if I would give recipes—this I cannot do as I have none. I use nothing in combination with the maple. Often I am asked if I use butter or cream. No, I do not. I have tried it but I think it takes away the genuine good maple flavor which I think is just what people want. I have learned from experience, and

it is the best teacher. I can see each year that I am improving and I am constantly finding some new trick which proves helpful. But remember I said the one essential is a good or I will make it stronger best grade of syrup to start with. Practice until you can get it so it is neither too hard nor too soft. Use a thermometer to determine this though there can be no set rule for this for I find the degree to which you cook it and have it just right varies due to the weather and the atmosphere—whether cold and clear or warm and damp—I have learned this through experience. This degree of temperature will range from 230 to 232 degrees. Cook and stir small quantities.—It is one of the most important rules to follow in obtaining smooth grain creamy candy which is what you desire. And you must work rapidly in stirring, also in getting into forms as it cools so quickly. I am making about three assortments, the nut bonbons, fancy nut cakes and the nut bars. These fill the ordinary demand. Then I make some other kinds by order: plain sugar in bricks, plain cakes, maple cream, etc. Prices this year range from 40 to 90c per pound. You will also have opportunity in connection with your candy to sell a quantity of sugar, both hard and soft and syrup, if you desire to do so.

I should consider it a favor if anyone here can give me any new ideas or suggestions at the close of the session or others. I, as did the Members of the Association, came here with hopes of receiving as well as giving and of learning and deriving benefit from the experiences of others and from these meetings and exhibits.

THURSDAY AFTERNOON SESSION.**CONFECTIONERS' REQUIREMENTS IN
MAPLE PRODUCTS.**

**CHARLES L. BIRD, SECRETARY, NEW ENGLAND
CONFECTIONERS' ASSOCIATION.**

The Manufacturing Confectioners appreciate your courtesy in asking them to send a representative to exchange views concerning the relations between the Maple Sugar Industry and the manufacture of candy.

It would be presumptuous to assume that you are not already well informed about Maple Sugar—obviously, therefore, the views which may be expressed will be from the standpoint of the candy-man.

Having in mind the modern methods used in making candy and the importance which the industry has reached in the commercial activities of the country, it may not be amiss to briefly review the history of candy-making, point out the proportionately small part Maple Sugar plays in relation to the whole and perchance open some of the avenues leading to a better understanding and closer business relations.

The Spaniards were among the earliest, if not the first, Europeans to develop the use of chocolate. In the year 1494 Columbus carried samples of the cacao plant back to Spain, but it was many years later that it became fashionable. We have authentic accounts of its use by the Aztecs, that marvelous race in Mexico that turned its page in history centuries ago, both as a drink and in the form of a paste, combined with vanilla, which was really and truly confectionery.

About the year 1600, the Spaniards began to use sugar and aromatics in combination with chocolate, and in the seventeenth century the French seem to be the first to introduce hard tablets of chocolate moulded into the form of a confection. So, you see, the world has had a sweet tooth far beyond the memory of the oldest inhabitant thereof.

When we think of candy, however, it is inseparably connected with sugar and from the introduction of sugar

into America in 1520 until now the manufacture of candy as an article of commerce has steadily increased. Its progress was slow for a great many years. The grinding stones of the Aztecs were replaced by crude hand mills which have in turn given way to the most approved labor-saving, hygienic handling machinery adopted by any industry in this century of remarkable mechanical achievement.

One thought, however, which is suggested by a study of the early history of the confectionery business may be worth dwelling on a moment. In the mediaeval cities where our fore-runners plied their trade, the guilds exercised a powerful influence in the community. They had a paternal interest in the individual members of the craft, loaning them money to embark in trade and helping them in divers ways. The apprentices were required to serve from seven to ten years and frequently had to produce a masterpiece of their workmanship as a proof of their efficiency.

Here is the thought that may be worth while to us. The master workmen were all supposed to pay the same prices for raw materials and were expected to get the same prices for similar products of their labor. The only test for their right to public favor and patronage was *QUALITY*. How many lines of industry could stand this test to-day?

We believe, however, that in spite of many lapses in the past, candy is more generally pure and wholesome than it has ever been at any period of its manufacture in this country.

The modern candy factory is an institution worthy of your profoundest respect. We need not go outside New England to find the best type. Picture an imposing building, equipped with every known device for making the work of the operative efficient, pleasant and safe. You will see ample dining-rooms and complete kitchens for the noon-day meal. Comfortable rest-rooms are provided for those who are temporarily indisposed and a regular hospital service under the charge of trained nurses is installed for those who may be so unfortunate as to need medical attention. Physicians, surgeons, dentists and oculists are always within reach and have stated hours during which they may be consulted.

Cleanliness of person and dress is required. Head-coverings and uniform garments are very generally used. You must not infer that every candy factory in New England is so completely equipped, but the example given is not

a solitary one and the standards set in all are high and constantly being set higher.

This care in manufacture is taken to increase the efficiency of the plants and because candy is a food. All food products should be made under the best possible conditions and present day manufacturers of confectionery yield to none in their efforts to produce their goods in accordance with the best known rules of hygiene.

The manufacturers of candy have been all too modest in proclaiming its value as food. It is composed principally of sugar, chocolate, nuts and fruits, all of high food value. On a basis of calories, chocolate candy has a higher food value per pound than most meats, cheese, eggs, milk or bread. It is also cheaper per food unit than most of these foods. It is, in fact, a properly balanced food, and a luxury only to those who so use it.

The commanders of the Army and Navy know this and have long known it. The factories of New England have supplied millions of pounds to men in the service and candy is now a part of the regular rations, each man being allowed half a pound every ten days.

Sugar is 100% carbohydrates. This is only a longer word for fuel. It produces immediate heat when taken into the system and satisfies the craving for a stimulant. For this reason, candy, or sugar in its most acceptable form, is recognized by pathologists as an excellent substitute for liquor.

Long quotations of figures are apt to be wearisome, but in no better way can we bring to your mind the importance of the confectionery business. The United States Food Administration is authority for the statement, made a year ago, that the amount of sugar used for the confectionery industry in the previous year was three hundred and fifty thousand tons. Seven hundred million pounds. The total consumption of sugar in the corresponding period was four million, one hundred thousand tons, eight billion, two hundred million pounds.

Quite contrary to the generally expressed opinion of the uninformed, who were unable to get as much sugar as they wanted in their sugar bowls, the amount of sugar used in the confectionery business was approximately eight per cent of the total consumption. You will note, if you please, that this percentage was the consumption in a normal year. From October, 1917, to November, 1918, the manufacturers were restricted, for the larger part of this period, to fifty per cent of their previous use.

This eight per cent of sugar combined with nuts, fruits and other ingredients, to which must be added the cost of the labor of sixty thousand people, results in a finished product of about three hundred million dollars a year. The confectionery business has attained a high place among the industrial occupations of the United States.

In leaving this phase of the subject, it might be interesting, perhaps instructive, to the Maple Sugar makers to tell just a few facts about the confectionery industry in New England.

Greater Boston has long enjoyed the reputation of being the acknowledged centre for high grade candy. The Boston manufacturers are quite willing to share whatever benefits may accrue from this situation with their fellow manufacturers in New England. Geographically, we are not far apart and industrially seem to be generally influenced by the same high motives.

In 1916, the value of the output in Massachusetts was placed by the State Bureau of Statistics at \$25,689,264, employing 9,081 persons. Estimating the output in the other New England States as five million dollars, we have more than thirty millions a year in New England.

Mr. President and Gentlemen: This is the industry to which your attention is invited. This is the industry of which your product is naturally and fundamentally a part.

It is entirely without disparagement that an allusion has been made to the comparatively small part Maple Sugar exerts on the whole. I cannot tell even approximately how much maple sugar is used by manufacturing confectioners. There are several hundred small manufacturers in New England making candy for their own trade of whom no record is kept, but in the aggregate have a considerable effect on the use of the commodities of which candy is made.

It is also true, there is a wide variance in the quantity of maple sugar produced, as shown by the several reports issued by the United States Department of Agriculture every ten years. The last figures which came to our notice were those of the census of 1910, in which a total quantity produced in the United States was given, about fourteen million pounds. Allowing for a most generous increase in production since that time, you can see that the amount used in candy of this total, would still be comparatively unimportant to an industry using seven hundred million pounds of sugar a year.

Furthermore, it is possible that Maple Sugar makers have in past years been satisfied with their market, and have not made any organized or determined attempt to sell their product to the candy manufacturers.

Let us assume in the light of the information concerning the importance of this industry, you will be open to the conviction that you, as Maple Sugar makers, ought to do more business with Candy men. It is a well known fact in the candy trade, and presumably equally well known to you, that the amount of Maple Sugar used by confectionery manufacturers at present, is very much less than that of a few years ago. I will try to give you some of the reasons as they appear to the candy manufacturers why this is true.

- 1st. Maple Sugar is in itself a confection. The best Maple Sugar satisfies a specific demand, and does not need the attention of the manufacturer of confectionery to improve its selling qualities. The demand, however, is somewhat localized, and is distinctly seasonal. The Maple flavor is delicate and even exquisite, but too much sweetness soon cloy, and the logical way to prolong the demand is to serve it in conjunction with other forms of candy, and distribute it more widely. This is the function of the confectionery manufacturer.
- 2nd. The differential in price between Maple Sugar and Granulated, which is the real basis of Candy, operates against its extensive use in confectionery. Going back a few years to the time when Maple Sugar was used more largely by manufacturers, sugar was five and a half cents a pound, Maple Sugar eleven cents or even less. For a number of years the parity remained about the same; but of late it has widened, so that, as you know, the amount of maple sugar used in candy has been noticeably lessened.
- 3rd. The Maple Sugar offered to manufacturers is not carefully graded. A shipment of a ton of Maple Sugar is likely to have as many colors as "Jacob's Coat." Maple Sugar offered to the confectionery trade generally contains too much moisture. Your custom is to ship it in pails, and it is a common occurrence for the pails to leak. This means waste and adds to the cost.

I have been to some pains to get at the truth about the waste in shipping, and the manufacturers generally complain that sufficient care and attention is not given to proper packing and shipping of Maple Sugar.

These appear to be the principal reasons why more Maple Sugar is not used by the wholesale manufacturers of confectionery. The candy business is open to the use of more Maple Sugar than ever. Every manufacturer would prefer to mark his Maple product "Maple Sugar" rather than be forced to use a substitute, and so label his goods.

How large a part of your production can be absorbed by this industry depends upon the price, the grading, the cooking and packing. So long as the difference in price between Maple and Granulated Sugar remains substantially where it is, just so long will the manufacturer's use of Maple Sugar continue along the present lines. That is, it will be used principally to increase the variety of the flavors in the package.

I have undertaken to show you what the Confectionery business has come to be in the hope and expectation that you will seriously consider the advisability of offering the trade your products in such form and at such prices as will be acceptable to the Confectionery manufacturers.

This brings us to the gist of the whole matter, which is set forth on your Program as "THE CONFECTIONER'S REQUIREMENTS IN MAPLE PRODUCTS."

Manufacturers of confectionery do not necessarily need the sugar made from the first run of the sap. This sugar is worth more to you to sell to the fancy grocery trade than it is to the candy manufacturers. They can use, and some prefer, the darker sugar, because it is more positive in flavor. This quality is desirable, and almost essential in chocolate covered goods.

The ideal method of packing and shipping your maple sugar to the candy trade would be to cook the sugar until it has a good coarse grain; boiling out more of the moisture; molding it in bricks, packed in sound boxes as nearly air-tight as possible. In this method of packing there is a possibility, if you wait too long for a higher price, or for any other reason, the sugar in bricks will become so hard, that it will not be easily worked. Therefore, it should be shipped to market without any loss of time.

It would seem that the Maple Sugar maker could grade his product into light, medium and dark sugar without any serious disturbance to the market price. The price realized for the fancy sugar would probably offset the lower

price for which you would be obliged to sell the dark product.

Summing up in a few words what the confectioner requires in Maple products:—

First:—He wants pure maple sugar of medium color and good grain.

Second:—He wants Maple Sugar at a lower price than he is now obliged to pay. He believes that if the Maple Sugar maker will use the same efficient methods of production that are used in other manufacturing industries, use more steam, literally and figuratively, speed up every process of manufacture and utilize the most approved machinery, he will be able to produce and sell his sugar at a lower price than he can at present. He will also be able to set a fixed price for his product at the beginning of the season.

The complaint among the Confectioners is very general, that it has been difficult to get the Maple Sugar maker to fix a price for his goods.

Third:—He wants the Sugar to come to him in uniform packages and in good order.

These are the principal requirements of the manufacturing confectioners for your products. How far you are able and willing to go toward making larger sales to the confectionery trade remains largely with you.

The manufacturers will be pleased to confer with you at any and all times to the end that the use of Maple Sugar in Candy may be largely increased.

The New England Manufacturing Confectioners' Association was formed with the avowed object to "advance the standard of the confectionery business in all practicable ways." The members have found the Association to be a great help in the trying times through which they have recently passed, and it is out of their own experience that they congratulate you on having an efficient organization in your industry that has withstood the trade storms of more than a quarter of a century.

The war has been won. The American and Allied Armies are marking time on enemy soil, waiting for the final terms of Peace. The World's greatest problems are yet to be solved and it is to organized industry, to Associations such as yours, that the Business Interests will turn for help and counsel in the great work of Industrial Reconstruction.

SCHOOLS AND THE MAPLE INDUSTRY.

BY DR. MILO B. HILLEGAS, OF MONTPELIER,

STATE COMMISSIONER OF EDUCATION.

ADDRESS DELIVERED AT THE BANQUET.

DOCTOR HILLEGAS: Mr. Chairman, Ladies and Gentlemen:—

I rise with some degree of embarrassment because I recognize here to-night a considerable number of people who were present on a similar occasion two years ago when I was introduced by Congressman Frank L. Greene. I am sure those who were present at that time will remember the words with which I was introduced. Mr. Greene said that at one time a man was visiting an insane asylum and as he went about the Institution with the superintendent, the superintendent said: "We are about to have an assembly of the inmates and I would like to have you speak to them." The visitor replied, "I don't know how to speak to people of that sort." The superintendent said, "Well, it doesn't make much difference what you say, I will call them together and it will give them an opportunity to get their minds off their troubles." Finally the man consented to speak to the inmates. After they were gathered together and he had spoken to them for a couple of minutes a woman cried out "My God, have we got to listen to this too?" The superintendent who was sitting near the speaker said: "Never mind, go right on: she only has lucid intervals once in three or four years."

G. Stanley Hall in one of his books tells of the number of operations he was able to perform when a boy. Mere mention of these cover some several pages of a comparatively large book. He includes such activities as being able to milk, to care for cattle, harness, drive and care for horses and teams, to mow with scythe and with a cradle and to do the many other things necessary on the farm. The older men here will recall many things which were common among the boys and girls of their age.

As a matter of fact, in the time of which Doctor Hall was speaking the home was nearly self sufficient. There

were very few things that were required in the home that were not produced on the farm or at least in the immediate neighborhood. I can remember as a boy in my grandfather's home that a tin can was virtually unknown. There was no mechanical device for opening such a thing in the home and when it was necessary to open a tin can, although my grandfather was not a man who used profanity, I am absolutely certain that grandmother was always relieved when the work had been accomplished without grandfather saying anything or without cutting his fingers with the old butcher knife used for that purpose. How conditions have changed! I am reminded as I pass through the country of the tremendous change that has taken place in our living. There is practically not a farm house in this state that cannot boast of its pile of empty tin cans somewhere either along the road side or in some other less conspicuous place.

To-morrow morning when you take your breakfast I expect you will have for fruit something that was produced either in Florida or in California or perhaps in the India Islands. The bread that you eat will probably be made of grain that was grown in the middle west or the great northwest and so with nearly every article of food.

No longer is the home self sufficient. We depend upon others and what is true in regard to the matter of food and clothing in the home is also true of the social condition in the home.

Our grandmothers never would have been content to go out on an afternoon with a few calling cards to leave at the different houses and be thankful the ladies were out so they could leave their cards rather than make a call. When our grandmothers and grandfathers went to make a call they went for two or three days and if they tarried for less than that time there was danger of giving offence to the persons on whom they called. Look at the magnificent old houses that we have around this state! They are the despair of the present day housekeepers! Yet our grandfathers and grandmothers needed exactly that size house in order to take care of the social affairs connected with their lives, for the activities that went on in the community, the singing school, the spelling bee, and the variety of interesting things taking place in that community were held in the home, so that there was little or no need at that time for newspapers, the telegraph, telephones, automobiles and the different affairs we have now.

These have all tended to bring more into the home but also to make that home more dependent upon the other

parts of the country. Our homes to-day are not self sufficient. We depend on other people, other communities, even other nations. It might well happen in our grandfathers' day that in the school itself very little attention should be given to these ordinary affairs that so occupied the attention of the boys and girls outside of school. I think our grandfathers would have resented having any teacher in the public school attempt to teach their children how to use the grass scythe or how to use an axe. Do you think our farmers' boys to-day know how to use the axe? Some months ago I went by a group of farmers' boys who were in school, and who were trying to split wood. Do you know what they did? They struck the axe straight down into that chunk every time then with their foot on the log tried to pry the axe out of it. Do you know that we have boys in the State of Vermont living on farms who cannot harness a team of horses and do it properly? It is absolutely true that we have boys living on farms that are selling milk and yet the boys themselves cannot milk a cow properly. All these things that are being taught in the public schools would have appealed to our grandfathers as the utmost folly. The grandfathers were teaching their boys and the grandmothers were teaching the girls in the home. The past couple of years have brought back to us many of these useful pursuits. The almost lost art of canning and preserving has been brought into the homes. At present our boys and girls are having the same advantages that our grandfathers and grandmothers had. Some attention must be given to these things in the school because such instruction is not received outside the school. I think I can say without fear of successful contradiction that the type of education our grandfathers received was a much more practical type than we are giving to-day because we have separated absolutely in most cases the work of the hands which our fathers and grandfathers got outside of school from the work in the school and trying to teach the boys and girls in the school what they should learn by actual doing with the hands outside of school.

My first proposition to present to you this evening is whatever is of importance in the community is a matter that should be considered in the public schools of your community. I want to guard myself against misunderstanding. I don't want the school to reform the home. I don't know how you feel about it, but I don't want to be reformed. Do you? If there is anything to give it is the home that is to give to the school. I wish I could impress that upon every home in this state. It is not the school

that is to give to the home but the home should give to the school. I want to clinch that point with an actual case here in the state.

Several years ago in one particular community in Vermont they were giving an agricultural course in the high school and very properly the teacher of that agricultural class decided that he would like to have a practical demonstration upon the judging of horses. He took his class down to the stable of a salesman and the salesman brought out a horse. The class looked the horse over. Everything went along all right until they got to the horse's mouth to find out his age. The instructor looked into the horse's mouth and called the attention of the boys to certain features there and said: "Here is a horse that is 7 years old." The man who was conducting that stable said not a word but soon after the class had left he took occasion to go up to the school and say to the principal: "For goodness sake! don't turn that fellow loose, he has just been down to my stable and pronounced a horse that is 17 years old 7 years old." Never again could that young man get a hearing in that community. Last year at the Vail school we arranged for the judging of horses. We did not put on one of our instructors to teach those boys how to judge a horse, we took a man who knew a horse from his heels to his ears and had him teach those boys how to judge a horse and in three days they knew more about horses than they would have known in three months of instruction by a person who had not had practical knowledge. I repeat, the home has more to give to the school than the school has to give to the home. There needs to be very close intimacy between the home and the school.

The next suggestion I offer is that you people who represent the progressive element in the sugar making industry of Vermont as well as farming and dairying should make it one of your first duties to see that the teacher of your school is invited to your place and that you talk that industry over with that teacher. If you will do that and bring to the mind of the instructor of these boys and girls the significance of all things agricultural the next generation 15 or 18 years from now, when they come here to these gatherings, will be facing an entirely different proposition from what you are facing.

I want to call your attention to the matter of the teachers in our rural schools. This state as well as this country is standing in the most serious condition in reference to teachers that we have ever faced. This morning I had occasion to look over some facts in reference to teachers

and I found that in October there were 22,500 rural schools in these United States without teachers, more than 5,000 schools in the cities and villages that were without teachers and we had actually to put into the rural schools of this country 120,000 young women who had never had a day of experience. Fortunately Vermont has not been as hard hit as some of the other states. Michigan reported one rural school in each ten without a teacher this fall; Ohio reported a shortage of 2,200 rural school teachers. We have not had a very marked shortage but I am free to say that if 10 more schools should become vacant within the next 10 days that they would have to remain without a teacher because we are at the limit of our teachers; and that is not because we have raised standards, mind you. You say money has called these teachers away from the school. Not a bit of it! Some, possibly, were attracted by larger salaries but the thing that has driven our teachers away is the fact that they have felt they were not rendering a really patriotic service. Just the moment you people—I am speaking directly to the more progressive farmers of this state—just the moment you get acquainted with that woman teacher, invite her to your home and talk with her about the things that concern you as a member of the Maple Sugar Makers' Association, you make her feel she is rendering a real service in your community, and just that moment we shall cease to be troubled by our teachers leaving. It is because these girls are discouraged that they are leaving our schools in such numbers. Recently I went into a school room where there were assembled 25 boys and girls and there saw some of the best work done by that teacher I have seen in the state. I commented on the splendid work she was doing. I had seen a great deal of teaching in reading and yet that girl had the knack of teaching those children to read that was amazing to me. What was the situation? She felt that her life there was absolutely useless. There had not been one solitary soul in that community who had said a word to her about her work. How much it would have meant to that young girl if some family in that community or group of families had invited her into the home and talked over with her the situation in regard to the school. I don't see why we have been so short-sighted as to let these teachers go along and feel the way they are feeling. Consequently, I say that, first of all, you should get the teacher in the rural school into your home and discuss subjects with her so that she may know what you are thinking about these big problems. Talk over the maple sugar industry with her and the mar-

keting of the product or some of the other problems that should be taught in the school. The moment she gets interested in those thoughts they are going to work out in the school.

In the next place let me suggest that in your schools, you see to it that the maple sugar industry receives some consideration in the course of study. Why should we teach our children how to grow, gather and can pineapples in the Hawaiian Islands and leave untaught the whole matter of the maple sugar industry in Vermont? Why should we teach the manner of growing and the method of transportation of fruits and grains in other states and leave untaught the very things on which the life interests of these boys and girls of ours depend? I suggest to you that you see to it that in the schools in your community the things in which you are interested find their way into the course of study and that our boys and girls learn about these.

As a third suggestion, I believe it is entirely possible in each one of these little rural schools as well as in the larger schools to have an exhibit of products. Let these exhibitions of products take the place of the old spelling-bees. There ought not to be a month in the year when something that is of interest to the farmers and people in a given community should not be shown in the rural school. I want to leave as the main suggestion of this occasion that whatever is of interest to you in the community is of interest to the public school and to suggest that you take unusual precaution and go out of your way to invite the teachers into your home and talk with them about the things that interest you as progressive farmers in order that these things may be taught our boys and girls in the school. Last of all, have an exhibition in your school of the products of your immediate community and I will make you this promise that if any of you are interested in having these exhibitions in your school and will write to me I will urge the Commissioner of Agriculture to send to you some one who can help you in this work, to make it the event in your community, so that all the farmers will be brought together in the schools and then you will enjoy such times as you used to have and such as your fathers and mothers and grandfathers and grandmothers always had in the rural communities.

**THE SORGHUM INDUSTRY,
ITS CULTIVATION AND MANUFACTURE.**

MR. O. G. CRANDALL, MILTON JUNCTION, WISCONSIN.

Fellow Citizens, Ladies and Gentlemen of the Association:

When your secretary asked me to present a paper before the Association on, "Sorghum, Its Cultivation and Manufacture," I hesitated before making an affirmative answer to his request.

After due consideration and taking into account the straightened condition of this country in regard to the sugar question, I came to the conclusion that it was my patriotic duty to give the public what little knowledge I have gained in an experience of over thirty years with this industry.

Some of you may have read in "The Rural New Yorker," issued May 18, 1918, my superficial note on this same subject, out of which grew the correspondence with your secretary, which correspondence is the palpable reason I am with you to-day.

That the public has a reviving interest in this industry, especially among the farmers, is evidenced by the fact that since the publication of the article referred to I have received letters of inquiry from many states which are not usually raising sorghum in regard to this subject. The war has brought a condition in the sugar situation in which the people are looking for and accepting any substitute, even at an advanced cost, if it meets the situation and relieves the sugar shortage. This is what sorghum syrup is doing at the present time, especially in those states best adapted for its production.

In presenting this subject I shall not endeavor to present any untried theories but *facts* acquired by actual experience in connection with this industry. In beginning the discussion of this subject we might first inquire what is Sorghum and what relation does it sustain to other sugar producing plants. Its botanical name is, "*Halcus Saccharatum*," or in other words, "Sweet Sorgo," and sometimes called "North China Sugar Cane." We must not

confound this species of which there are many with the "Saccharum" or sugar cane of commerce.

"Sweet Sorgo" grows both wild and cultivated in both East and West Indies, also Africa. Sorghum and sugar cane require a warm climate but sorghum canes will mature much farther north than most other species of sugar producing plants.

There are as many kinds of sorghum as there are of wheat, but three or four kinds have been settled upon as best adapted to our climate. The mode of propagation differs in sorghum and sugar cane. Sorghum is always propagated from *seed* while sugar cane is renewed each season by placing the canes which are cut and buried in ditches until the planting season in furrows a double row of canes with joints mismatched from which spring the new canes or plants.

In treating this subject, when the term *cane* is used you may take it to mean sorghum cane unless otherwise specified.

GROWING SORGHUM.

In growing cane like most crops, favorable conditions must prevail. The selection of soil and seed are most important. Sorghum is naturally a warm climate plant, therefore, warm soils or sandy loam soils are best adapted for its growth and maturity, and also for the quality of its product. Clay lands have produced excellent quality when not too heavy and in good tilth with perhaps less yield.

To those not acquainted with cane growing perhaps a detailed procedure of growing a crop would be well. We will say Southern Wisconsin would give a fair criterion for most cane producing states.

First, Select soil a little sandy but not too dry. Like corn cane needs moisture. Do not fertilize unless thoroughly incorporated into the soil the year previous as too much free carbon will be absorbed by the plants and the syrup will be strong in flavor and dark in color. Marshy land has the same effect. Prepare the soil by having a fine and firm seed bed which is not liable to dry out. The fine seed needs this condition for germination. Early Amber is the kind that gives best results being of good size and perhaps the best yielder, except the "Chinese White Imphe" which does not mature well only under exceptional conditions.

Plant two inches deep in rows three feet by three feet 10 inches. The wideness running north and south. Cane

flourishes in sunshine and the more exposed the canes are to it at maturing time the better. Large fields may be planted with the horse planter but I prefer the hoe as it raises the hill above the surrounding surface and is more easily cultivated and less apt to be buried down by heavy rains. Plant 10 or 12 seeds in a hill to be sure of a stand and then thin to five stalks when hoeing; more canes will not develop to the proper size.

The larger the canes the more juice-containing pith in proportion to the shell. If too few canes there will be suckers which must be removed when the canes are two or three feet high, leaving five desirable stalks. Cane should be cultivated often and the soil kept loose and free from weeds so as to stimulate it to the greatest possible growths in the early part of the season which allows it to mature early and so escape a possible early frost.

Working close to the cane when the roots are long enough to be severed by the corn hoe must not be practiced but winging up the dirt from the middle of the row, not too high, is advantageous, especially at harvest time as the cane can be laid across these ridges to keep it up from the ground and is then in a good position for binding.

The young plants are quite tender when they first come up and have two blades or leaves of a yellowish color and is often mistaken for pigeon grass which it much resembles. One distinguishing feature is the cane plants are a little more stocky with leaves curved downward and slightly crinkled edge tinged with red. It should be hand hoed, all weeds pulled out to give it a proper start. It grows slowly at first but is getting a strong root which later on will throw up the canes very rapidly. After the cane is three feet high all suckers and all canes but five of the largest and most thrifty should be removed.

These make excellent feed for stock; *Harvest time* in Wisconsin, usually beginning about the 15th to the 20th of September. Cane is not all planted at the same time, usually at the time of planting corn, consequently there are different stages of maturity, and different soils have the same effect, so the mills start on the early crops and take them as they mature. Often the crops mature faster then they can be made up or an early frost hastens the cutting. It is then harvested and stood up in the mill yard.

The proper time to cut cane is when the seed is just past the dough and if possible it should be made into syrup at once. At this stage it will make the most syrup for the reason that it contains the most sap when fresh. The quantity of juice carried off by cane passing out of the mill

is no greater than it is in pressing dryer cane, the juice of which is much sweeter, therefore the greater loss.

The process of harvesting cane is quite simple. First, with a knife edged stick or lath beat off the leaves clean as possible. This may be done three or four days before cutting. Do not leave it longer for there is a tendency to a new growth which will make the juice bitter and an inferior or worthless quality will result. After the leaves are removed the seed is cut off. This is quickly done bending the canes down under the left arm and with one or two strokes with the corn hook cut the heads off as near the first joint as you can. Then while you have the hill in hand cut the canes as square off close to the ground as possible, laying the canes in suitable piles for binding, raking out any leaves or seed with the corn hook before laying down. Cane is sometimes cut with a corn binder but the practice ought to be discouraged. A great amount of leaves and seed is bound with the cane, also the butts are mangled by the cutting knives, and the canes broken down over the band as it is thrown from the machine. Such cane will not keep in the yard, and I refuse to accept such cane unless it can be made into syrup immediately.

Binding the cane will not be necessary if you have a short haul. An easy way to handle cane is to put a six inch wide tail board in your wagon box. Begin loading the cane so it just balances down over the six inch board and continue loading toward the front. By the time you have reached the front the butts have built up to a level. Slip two short boards for stakes on either side between the cane and the box and continue to pile up the cane as high as convenient. Cane loaded this way comes off the load just the reverse to the way it was loaded and will not bind or slobber as when the butts are loaded front and back and the small ends of the cane are lapped together.

MAKING THE CANE INTO SYRUP.

This is the most exacting part of the cane business. Good syrup can not be obtained from cane that is not properly handled for cane that is *good* must be kept good. It must be kept dry and not allowed to get water soaked. If the weather is warm, wet cane will mould if laid flat. Its weight will pack it so closely that in a short time it will heat and the syrup will have a musty taste. Sheds for housing the cane are expensive and not much better results are obtained. When cane is hauled to the yard if it is stood up like shocks of corn it will keep any reasonable length of

time. The tops will pack so closely that they will shed rain like a tent while the butts will be loose enough to allow the air to circulate all through the shock. I have had cane stand three weeks in the yard and keep in perfect condition.

CRUSHING THE CANE.

There are several sizes and styles of crushers. Some of the small plants use the sweep mill operated by horse power. The larger or geared mills are driven by steam or gasoline power. The press used in my factory consists of three 12 by 20 inch horizontal rolls with double back gear with double fulcrum weight pressure, exerting about 2,000 lbs. of pressure at each end of the movable roll. This mill is driven by an eight horse power steam engine. The cane is drawn through the mill about 30 feet a minute. If cane is drawn through the mill at too high speed the pith containing the juice will be thrown out in small particles, without being crushed, and carried to the tanks with the juice.

This pomace as it is called is very difficult to separate from the sap as it seals up any strainer fine enough to take it out. Sufficient time must be given for compression and drainage as the cane passes through the mill. The heavy geared mill referred to will furnish juice to make 15 or 20 gallons of syrup per hour. After the cane is crushed, on, the manipulation of the juice depends the success or failure in making good syrup. In the application of one or two principles of the defecation of the juice lies the secret of good syrup making. I will try to make these principles clear further on in this paper.

There are several systems or processes of treating the sap before and during its reduction to syrup. If you run a custom mill, handling crops large and small, there must be some equitable way to determine how much syrup can be obtained from a certain quantity of juice. If all juice were of the same degree of sweetness one rule would apply to all, but this is not the case. The sweet content must be determined before its reduction to syrup so that the customer may receive what is justly due him. This applies where crops are small and several are run together. This is determined by a saccharometer by which the specific gravity of the juice is compared with water. Syrup is 60.

Before boiling, the juice is run into settling tanks where all heavier matter, such as seed or dirt, settles to the bottom and the lighter material is skimmed off. The

juice is then siphoned off directly to the evaporators or other tanks. Some manufacturers use cream of lime to neutralize the acidity of the juice, stirring it in before boiling. The quantity is determined by testing with litmus paper. This is rather a delicate operation and is better handled by the chemist than by a novice. The benefit derived hardly pays the cost of the labor, besides limed juice produces what is *called* a bland syrup that is without *acid*, an element very important to the cooking quality of the syrup.

If too much lime is used the syrup will be dark and has an insipid taste. It comes out about like the biscuit when the cook uses soda to excess. Sometimes certain kinds of clay are reduced to the consistency of cream and thoroughly stirred into the juice and then allowed to settle, carrying to the bottom most of the green matter and other impurities. It is then syphoned off very quietly so as not to disturb the sediment in the tanks. The results are good but the process slow and costly as the tanks must be cleaned before another bath is run in.

There is still *another* process called the diffusion process. It is practically the same as that used in the sugar beet factories of southern Wisconsin. This process was patented by Magnus Swenson, once connected with the State University of Wisconsin. The cane is not crushed but cut by machinery into pieces about an inch long and run into cylindrical steel tanks. Enough water is run over it to fill all space between the particles of cane. A steam tight cover is then clamped on the tanks. They are then subjected to 100 pounds steam pressure. The steam forces the water, which is of a different density, from the cane through it, carrying the sweet with it. The process is repeated to get all the sweet out. This liquid is reduced in vacuum pans.

This process was used by the U. S. Government at its experiment station at Ft. Scott, Kansas, where it had several years ago over 600 acres planted to sorghum. An endeavor was made to make sugar from Sorghum. It was not a success, the reason we have not time to state here. (Acid in syrup.)

The Sorghum maker has two ways of applying heat for reducing juice to syrup. First, by direct heat or fire, and second, by indirect heat or steam. In either case the principal thing is the perfect defecation of the juice. Unclarified juice will not make fine syrup no matter how good the *cane* may be.

Perhaps a cursory description of the evaporator used in my plant would be of interest and give a clearer idea

of the Defecation process. On an arch 30 feet long are set two evaporators. One 10 and one 20 feet long. The first is called the Defecator or self-skimmer, so-called because no hand skimming is done on this evaporator. The second pan is the finisher which evaporates the purified juice, which is continually running into it from the Defecator.

The Defecator is placed directly over the fire at the front end of the arch. The same fire serves both Defecator and Finisher. The Defecator makes use of the principle, that boiling liquid *always* after releasing its vapor flows to the outside or cooler portion of the receptacle containing it. The Defecator is divided length wise into two divisions by 3-8 inch wood sides. The third side runs parallel with the other two but is placed one foot from one of the outsides, but having an opening 16 inches long at both ends. This divides the Defecator into two parts but opening together at each end. One division three feet wide is directly over the fire. The other division one foot wide projects outside the arch and forms a cooling surface for the boiling of the juice.

Over the three foot division is placed a steam tight metal-lined lid with full width openings at both ends under the surface of the juice. When boiling commences the steam forces the rising impurities from under the lid and it then flows to the cool division which is outside the arch. The cooled juice flows back under the lid and the process repeated.

The scum is continually gathering in this outside division which never boils. An opening is made in the center of this outside division. The scum is forced up an incline and drops through the opening to the scum bucket beneath. A feed pipe five feet long from the finisher extends back under the lid continually supplying the finisher with clarified juice. Cold juice is continually running into the Defecator and finished syrup out of the finishing pan. The juice is run three inches deep in the Defecator and one inch in the finisher.

Considerable skill is necessary to keep the proper depth of juice in the finishing pan. Otherwise, it might scorch before reaching the outlet or it might not be cooked enough. Syrup shrinks by cooling on account of the hot vapor it contains. It should be cooled before being put in containers. To accomplish this in my plant the syrup is run over a cooling board 18 inches by 8 feet set on a slight incline. The syrup flows slowly down this board and drops into a syrup well, where it is pumped up like water with a common

pitcher spouted pump into any receptacle desired. All is screened in making a clean and desirable way to handle the syrup.

Syrup is either weighed or measured. Eleven pounds is standard weight. Heavy syrup will weigh more. Most manufacturers at the present time put up their syrup in tin pails and cans, pails holding two quarts to two gallons and cans of five gallons each. These are sold in the original packages. Sorghum like most other products is selling at abnormal prices. The northern grown product is hard to obtain at \$1.25 to \$1.75 per gallon. I have had some inquiry in regard to a standard price to be paid for a ton of cane or how much syrup should be given in exchange for a ton of cane. My experience has proven to me that no just specified fixed price can be made until the quantity of juice and sweet test are known.

For example: A quantity of cane produces 100 gallons of juice. Its sweet test is 9 by the saccharometer. The product will be 15 gallons of syrup. Another equal amount of cane by weight produces only 75 gallons of juice and the test is 7, and the product will be only 8 7-12 gallons of syrup. Some manufacturers may buy cane by the ton or give so much syrup for a ton of cane, but an equitable exchange is hardly possible as shown by the example given. The average quantity of syrup from a ton of cane is near eleven gallons, but no fast rule can be given.

The cost of producing a certain number of gallons of syrup will vary according to conditions. An acre of cane ought to be raised nearly as cheap as an acre of corn to the time of harvest. The expense from that time on will vary, condition of crop, distance from mill, cost of labor, all have to be reckoned with. The custom mill usually takes one-half for making. If he gets cash it is somewhat less, as he is relieved of the expense of storing and selling the syrup. Plant tested seed and start the crop right. It will pay all through.

USES OF CANE OTHER THAN FOR SYRUP.

Many farmers plant or sow sorghum for forage or silage. When raised for this purpose it is usually sown in drills about two feet apart using a corn planter with slides suitable for dropping the seed. It is planted thick to make the fodder fine. If you feed it green it is greatly relished by stock. For silage it is grown a little coarser and should be put in the silo with corn as an *all* cane sil-

age, on account of its sugar content may develop too much fermentation and make silage with too much acid.

Another item which must be placed on the credit side of the cane business is the seed. An acre of mature cane will yield 18 or 20 bushels of seed. The heads are thrown into small piles and when cured, it is threshed like wheat and is good food for poultry or stock.

Naturally we ask what will be the future of the cane industry, will it increase and will there be a growing demand for this product? War conditions increased the acreage three or four fold last year. More than 200 acres were raised on the state farms of Wisconsin in the past season. The state agricultural department urged the planting of cane as a relief to the sugar shortage. More would have been planted if machinery could have been procured to make it up. Iron and steel were turned to war purposes and many ceased to make sorghum machinery. We hope conditions will improve the coming season.

It looks as if sugar would be high for a number of years to come. As long as Uncle Sam runs a corner grocery for the old world he will have to be supplied with goods. If present conditions continue we can modify the situation at least locally by using sorghum. There ought to be two or more mills in every township where cane can be raised. Eliminate cost of production by making the syrup near where it is grown.

One problem in Wisconsin is the fuel question. Wood is almost gone and coal is high. Coal is not adapted to the direct heat evaporators. Its heat is too local and does not work well with the long pans. The larger plants are using steam. This mode of reducing requires quite a money outlay. One large plant has cut fuel cost by running the cane through two large mills. The bagasse is then dry enough to run direct to an 85 horse boiler and is burned for making steam.

This firm made 10,000 gallons of syrup this season at a saving in fuel of about 75%. Only 25 cords of wood aside from the bagasse were used for the 10,000 gallons. Burning the dried bagasse has been tried with varying success. A special furnace construction is necessary to use it. The cost of preparing and handling has not made it very popular. It requires the constant labor of one man to feed it through a metal chute to the grates as needed. A good draft and expert feeding of the furnace are required for good results. It is not to be depended on in wet weather.

I can hardly close this paper without emphasizing the necessity of planting pure seed. Cane seed will deteriorate

rate like other seed. Thousands of dollars are lost every year through planting poor seed. Cane seed should be *bred up* through selection like corn. A proper way to do this to my mind would be to pass through a mature field of cane and select stalks with points as near ideal as possible.

These points should be: First, Strong, branching heads with seed well matured, stalk of good girth and length, holding its size well to the top, joints long and note the thickness of the shell. It should be thin. Its leaves should be long, well curved and not too stocky. The juice of these stalks should be tested with the saccharometer and each stalk tagged with its sweet content. Plant seed from stalks that test highest. This practice each year will keep the cane in the highest state of efficiency.

Again we ask, will it pay the farmer to raise Sorghum? Emphatically, we say, "Yes." Sorghum has always held its place in the household economy. There seems to be no danger of over stocking the demand for it. For the last ten years the local demand has far exceeded the supply, and has kept pace with the fluctuating price of sugar. The farmer who provides his family with this wholesome sweet, makes himself independent of the sugar trust to a great extent and the commissions of the middle man.

It is a safe crop to raise, a patriotic act, under the present conditions of the sugar shortage, a direct product of the farm to the farmers' table without adulteration or expensive manipulation, and a wholesome and nutritious food.

THE ELEMENTS OF MAPLE SUGAR MAKING.

BY C. O. ORMSBEE, MONTPELIER.

I believe that I am justly owing you sugar makers two apologies. The first is for appearing before you with a second paper, and the second, is for selecting a subject with which all of you are supposed to be perfectly familiar. My first apology is that a gentleman whom I had engaged to speak upon a subject of interest was taken ill and was forced to cancel his engagement, and at so late a date that it was impossible for me to engage another in time to make the announcement in the program. Thus it became necessary for me to get into the gap, myself, or leave an opening, and I chose the former course. And I want to say to you sugar makers, right here, that if you do not wish me to have so much to say, Get on deck yourselves. If I am unable to give you new points, then you get right up here and tell me something about the maple sugar business that I do not know, and I will thank you for it.

My second apology is, that, during the past year, I have received a great many inquiries from directors in club work, and from beginners and amateurs in the maple sugar business, asking for a publication of some sort that would be suitable for their needs. I went over the whole literature relating to the maple industry, and I found that there is no such a publication available and never has been. So, to fill this gap, I set myself to work to prepare a brief paper, and, while I shall tell you much that will be kindergarten work to you, I believe that I shall give a few points that will be new in the experience of many of you, and I know that there are many among you who could tell me many things that I do not know if you chose to do so.

But I want to speak briefly about the business of making maple sugar before I touch upon the details of manufacture. Along about the time that this Association was organized, maple sugar makers were trying to put their product on the market in competition with, and to be used for the same purposes as cane sugar which was then being imported with few or no tariff restrictions. And they found it pretty uphill business. It was a tough proposition. It could not be otherwise when in direct competi-

tion with granulated sugar at four cents a pound. And the maple sugar makers made no bones about saying that the business did not pay expenses. And they said this so often that they got the habit fastened upon themselves and it has clung to them more closely than any opium habit could have clung and even until the present time. And some of them have made the statement so many times, and have sworn to it so strongly, that they have not only made others believe it but they have come to believe it, themselves. In consequence of this, only about one-half the available trees in the state are tapped, and the farmer who does make maple sugar goes about the work in a half-hearted apologetic manner, as though he were afraid people might think him a little deficient, mentally.

Now I was talking, but a few days ago, with a man who has one thousand trees together with a full equipment, and he told me that he would make no sugar next season, because, as he said, it was like taking money out of his pocket and throwing it away. And this is the balance sheet by which he calculated his apparent loss:—

Labor of self and team 1 month	\$100.00
Wages and board of hired man 1 month	50.00
20 cords of wood @ \$5.00 per cord	100.00
Interest on equipment	60.00
Interest on stumpage value of trees	120.00

Making a total expense of	<u>\$430.00</u>
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Against this there is a possible yield of 3,000 pounds of sugar, worth, in the aggregate, 450 dollars, leaving him, as he said, only twenty dollars for his month's work, and the incidentals would swallow that. And I presume I have a hundred similar statements all showing an actual loss to the farmer in the manufacture of maple sugar. But all these statements are misleading, and I want to take just enough of your time to show you wherein the error lies.

And, in the analysis of the first item, I ask you if a farmer's time is worth one hundred dollars during the month of April? That is, Can he earn one hundred dollars at any work that is then within his reach? To be sure, he can take his team right now, and perhaps earn a good deal more than that sum, by drawing logs or pulp wood during the month of January. And next June he may be able to put his team on the State road and earn a good deal more. But you and I know, that, next April, the average maple sugar maker will be so tied to a cow's tail that he will not be able to earn one red cent outside the

care of his dairy and stock. But let that pass. Assuming that his time is worth one hundred dollars a month, how many days of that month will be spent in actual work in the sugar orchard? I have a series of dairies extending over a period of twenty-five years and giving in detail, the work that was done during every day of that time. And I find, that during all those years, there was but one instance in which the actual time spent in work in the sugar place exceeded eighteen days. And the average was a little less than fifteen. But let that pass. Assuming the charge against the sugar account is a legitimate one, and that it should be allowed to stand in full, the question arises, Who gets that one hundred dollars? To whom is it paid? It is paid right straight to the sugar maker himself. Hence it must be stricken out of this equation. It has a place in the account of the sugar cost as a unit, but it has no place in the farmer's account with the sugar place.

I am not going to take the time to discuss the two next items. But, passing to the fourth, which is for sixty dollars' interest on equipment, I just want to ask you sugar makers, Who gets that interest? You get it yourselves, if you use the equipment. And, if you do not use the equipment, the interest accumulates just the same, but is lost, and nobody gets it. And, if you cut your maple trees, you lose the interest on the equipment and the principal too. And the same is true in regard to the next item which calls for interest on the stumpage value of the trees. You have your money invested in the trees, and, if you use them you get your interest. If you do not tap them, you lose your interest, and nobody gets it. That's the idea. It is claimed by the slackers, that, if the trees were made into fire wood, the interest on the money that the wood would bring would amount to more than the interest on the stumpage value of the trees. I am not going to discuss that point, except to ask, If you cannot get help to make your sugar, where are you going to get help to cut your trees? And, if you can get help to cut your trees, why can't you get help to make your sugar? And so I say to you, while you allow those trees to stand, tap them, and utilize them in the manufacture of maple sugar. Not long ago you were horrified to read of the awful waste that followed the sinking of a ship with one thousand tons of sugar. The state of Vermont is annually allowing five thousand tons of the finest sugar the world ever saw to go to waste, just by a neglect to tap the available maple trees. It is an average of 40,000 pounds for every town in the state. And so I say again, Get busy and do your bit.

And now I want to make just one comparison. Normally, and under normal conditions and during a five-year period, the state produces maple products to the average value of 1,306,000 dollars annually. We consume a good deal, right here at home, but it is safe to say that 1,000,000 dollars' worth goes out of the state, and returns in the form of cold cash, every dollar of which remains not only in the state, but right on the farms where the sugar originated. And every dollar represents a waste product, combined with labor that does not interfere in the least with any other farm occupation. So much for sugar.

The average value of the total dairy products during the same period, amounted to 16,800,000 dollars. To produce this amount, the farmers of Vermont fed practically all the hay and grain and ensilage they could raise, and bought from other states, grain and feed to the value of 14,000,000 dollars, and phosphate to the value of 3,500,000 dollars. Now then, which industry is of the greatest benefit to the state, and especially to the farmers of Vermont? And which industry ought you to support?

And now I will get right down to my subject. I presume it will be like primary work to most of you old veterans. Still, I believe that I shall be able to present some points that will be new to most of you. For instance:—I don't believe there is a man among you who can make a sugar like this sample from Beauce county, Canada. You say that you don't want to. And I am sure that I do not want you to imitate this grade. I want you to make a quality that will sell readily for a dollar a pound. And you can do it. But you will not. Eighty per cent of all the maple sugar produced in this state goes to the blenders. Most of what you men produce is of a better quality than they care to buy. But some of it is not, and a large percentage of the product of even the best of sugar makers finds its way to the blenders. And these people will pay two cents a pound more for this grade of sugar than for that which you make. Not because it has a dark color, and, possibly, a strong flavor, but because it is boiled to a temperature of 265 degrees and a water content of only five per cent. And, when the blender buys a thousand pounds of this sugar, he knows that he is paying for only fifty pounds of water, instead of two hundred pounds as he does when he buys your product. And again, sugar of this density will keep indefinitely, in ordinary storage while that which you make will not. I know an old lady who now treasures a cake of just such sugar as a memento given her by her lover who went to the Civil War and never came back. And again,

sugar of this kind may be marketed in burlap bags at a cost of one-fifth of a cent a pound for packages, while yours costs closely around two cents a pound for the package. So that this Beauce county sugar is not to be sneered at. The man who makes it makes more clear money than you make when you produce a high grade article and sell it to the blenders.

Now I am not advocating the manufacture of maple sugar of this kind. I don't want you to make it. I want you to make a grade that will sell for one dollar a pound. But if you are bound and determined to sell your product to the blenders, then make a low grade product and sell it for what it will bring. Don't waste your time and energy in making a fancy article and put it on the market in competition with this grade. As a matter of fact, however, you cannot make a grade like this any more than the Beauce county sugar can make a grade like that on the exhibition tables. Long before your syrup would reach a temperature of 260 degrees, it would burn to a charcoal. But, before I finish I will tell you how this product is made.

Now if you will pardon this long digression I will try and not fly off in a tangent again. We have in the state, not far from five million maple trees that are available but are not utilized in the manufacture of maple sugar. I want to see them worked to the utmost. In addition to these we have upwards of one million more that are scattered or are in small groves in our fields, or line our roadsides or furnish shade for our lawns. From their isolation these cannot be utilized to advantage by the sugar maker. But they do furnish an important source of revenue to the boys and girls of the state who would otherwise be unemployed at this season. And it is these whom I want to reach at the present time, and, in proof of the foregoing statement I will cite the instance of the two little girls who made forty pounds of maple sugar from a row of maple trees that lined the roadside, collecting the sap in lard pails, fruit cans, tin pans and various other receptacles, and boiling it on an old cook-stove set up in the back yard for their convenience. And of the two twelve year old boys who made 300 pounds of sugar from a grove of maple trees in a back pasture, using an old style equipment that had been discarded many years previous, by a more up-to-date sugar maker, and boiling the sap on a stone arch which they, themselves, built of stones picked from the field, and utilizing wood that was decaying on the ground for fuel. And of the little girl who made six gallons of syrup under similar conditions, but boiling the sap in the family wash

boiler. And of the sixteen year old boy who last spring made fifty-five gallons of syrup under similar conditions, and sold the syrup for two dollars a gallon and bought a liberty bond with the proceeds. And of the two boys who made 150 pounds of sugar from a grove of maple trees growing in an almost inaccessible gully. They had nothing in the line of an equipment with which to work, and no money which to buy one, but they fitted wooden plugs to the tap-holes and bored holes through them, and used them for spouts. They caught the sap in any kind of a receptacle they could get, even, in some instances hewing out troughs, after the fashion of a century and a half ago. And they boiled the sap in three iron kettles which they hung upon poles. And of the housewife who made four gallons of syrup from the maple trees in and around her back yard, catching the sap in various kitchen utensils not otherwise in use, and boiling it on the kitchen stove. And, lastly, of the six year old twins who gathered the sap from a row of roadside maples which their father tapped, and, under the supervision of their mother made eight pounds of sugar cakes. And I paid fifty cents apiece for a couple of cakes, and I don't know which I enjoyed the most,—the sugar that I bought or the kisses that they gave me. But those girls are now seventeen years old, and I rather think that I would prefer the kisses, though that is saying nothing against the quality of the sugar.

These are but a few of the scores of instances which might be cited, but the numbers should be enumerated by the tens of thousands instead of by the paltry scores. This is a utilitarian view of the educational scheme which Mr. Hillegas has been explaining. There are 62,000 school children in the state and it is up to you to aid in this work by using your influence to get those boys, and the girls too, right out among the maples. Don't be afraid of their taking cold, for that is the last thing they will take. There are two places where one never takes cold. One is when working among the pine trees of the north, and the other is when working over the steam of boiling sap.

Now how may the boys and girls become interested in this matter? Well I will admit that there is a very large percentage of the hot-house breed, that have not energy enough to get out of bed until the room is warmed to a temperature of seventy degrees, and who are too tender to dip their fingers into moderately cool water. These are incorrigible, so let them go. They are worthless for any utilitarian purpose, and are becoming more worthless every year. And their comparative numbers are increasing every

year. But let them go. They are not worth bothering with. There are plenty of red-blooded boys to take up the work, if you get at them before they get the cigarette habit hitched to them. And, by the way, you never knew a boy to acquire the cigarette habit if he had plenty of maple sugar to eat, and the exercise for mind and body that he finds when working in the sugar place. And you never knew a girl to acquire the gum-chewing habit if her appetite was satisfied with maple sugar. But let that pass. The main question is, How may they be interested? And I want to tell you right here, that, while there may be trouble in interesting the dudes and slackers that are good for nothing anyway, there is no trouble at all in interesting the red-blooded boys and girls who are worth raising. Show them the way, and encourage them a little and the red corpuscles will do the rest.

The question then arises, How can they or people who have had no experience in the business make maple sugar? In answer to this I can do no better than to quote from a talk given this Association several years ago by Mr. Holden, who said that the only way to make maple sugar is to go ahead and make maple sugar. Tap all the available trees that you can handle. Then tap a few more and work a little harder. Have three points in view when tapping. First, select a bright, clean spot on the tree where the bark is fresh, healthy and vigorous and not too thick. Second, tap at the elevation at which you can use the bit most easily. Within reasonable limits there is no appreciable difference in the yield between high and low tap-holes, and it does not pay to put yourself into an uncomfortable position when doing your work. Third, tap on the side from which the sap can be gathered most conveniently. Never mind the points of compass for they have no appreciable influence, but keep these three points well in view, laying far the most stress on the first.

Use the kind of spouts that you have. The type of spout has no influence on the yield of sap. If you have the tubular types, the kind that are driven into the tap-hole, use them in preference because they are the most convenient and suspend the bucket from the hook that is attached. If you have only the old-fashioned, semi-circular type that are driven into the bark, use them. And drive a nail into the tree to hang the bucket on. It won't hurt the tree a particle. Some will tell you to be sure and pull the nails out. I say leave them in the tree to discourage the man who kills the bird that lays the golden egg by taking the advice of the fuel administrator to cut the trees and so save

coal for the use of his city cousin who is raising hot-house boys for you farmers to feed. Leave the nails in the tree. The man who will cut a maple tree ought to have his axe spoiled. If you have not even this type of spouts, make wooden spouts as did the boy of whom I have told you. I can remember when the use of such spouts was common. I can remember, when, in my father's sugar bush, we used a hundred or more spouts made of sumac limbs with the pith burned out with a hot iron. And they yielded just as much sap as the Eureka spouts that were used with them.

And I say just the same in regard to the buckets. Use the best tin or galvanized iron buckets that are made, if you have them, or can afford to buy them. Otherwise use just what you can get. The citations given show what can be done in the way of makeshifts. And I want to tell you that just as good sugar can be made from sap caught in old wooden buckets as from that caught in the very best buckets that can be made. They may not be quite so convenient to handle and clean, but use more elbow grease and keep them clean. Scald the old buckets thoroughly, dry them and paint the interior well with good, lead and oil paint. Put it on thick enough to fill the cracks and exclude all sap-souring bacteria, and, other things being equal, you can make just as nice sugar and syrup as any that is here on exhibition. But be sure that you do use good lead and oil paint, for a cheap paint may impart an unpleasant flavor. In regard to covers. That is a different proposition. Sometimes they are an advantage, and sometimes they are a nuisance. It is a good deal like the advice in regard to carrying a revolver given by the old ranger to the man who was about to settle in Texas in an early day. He said: "You better have one handy. You may live here a long time and not need one, but when you do need one you will need it bad, and you will need it in a hurry, too." That advice is perfectly applicable to the use of covers for sap buckets.

And the same applies to the boiling apparatus. Use what you have. If you haven't anything in the way of a boiling equipment, and have gumption enough about you so you ought to be allowed to live, any of these companies who are represented in the room below, will be glad to sell you a full equipment and wait for their pay until you have made sugar enough to pay for it. But you don't need such an expensive outfit. These modern evaporators are neat, easily managed, convenient. And they save a lot of trouble and bother. and hard work, and, on these accounts they are to be recommended. The various manufacturers are

my friends, and I don't want to say anything that will tend to hurt their business. But I am here to talk in the interest of the maple sugar maker. And I want to tell you that just as nice syrup or sugar can be made on an old-fashioned brick arch, and in the old style, Russia iron pans. That has been demonstrated time and again by the exhibits held by this Association. Only a few years ago the highest scoring sample of syrup but one, was made with just such an outfit. And that farmer burned green wood. And he used an old style, tubular heater, and old wooden storage tanks, and not one single utensil in his whole equipment was less than forty years old. And a part of his buckets were of unpainted wood, and were supposed to be fully ninety years old. It took elbow-grease, and lots of it to get those results, but he got them, and you can do the same if you set out for it. And you can make just as sweet sugar in an old cast iron kettle as in the best evaporator that was ever made. And the blenders stand ready to contract for all that you can make, and to pay you twenty cents a pound for it. It will not be quite as light colored and you cannot make it so, because the tannic acid in the sugar will combine with the iron and make black ink. And there is another reason for its dark color which I will explain a little later. But the blenders pay you good white money for it.

And a brick arch which you can lay up yourself at a low cost, if rightly built and rightly operated, is just as economical of fuel as the best cast iron arch in the room below. Heat is produced by the chemical union of oxygen with wood. And a given amount of wood will produce a given amount of heat and no more. And a given amount of heat will evaporate a given amount of sap and no more. And when you utilize all the heat produced, you evaporate all the sap that can be evaporated with that amount of fuel, no matter what kind of a rig you use. And the supreme test is the temperature of the chimney, and not the depth or number of the corrugations or the amount of surface exposed. If your chimney is cool you are utilizing all the heat, and if it is hot, you are wasting a portion of it no matter what kind of a rig you use. When you build your brick arch, make the firebox deep. Three feet is none too deep. Make the total length of the arch five times the length of the fire-box. Make the chimney of ample capacity, to carry off the smoke, but not very high. A tall chimney means a strong draft, and we don't want a strong draft at this end. A strong draft here will pull the blaze away from the pans, and draw it up the chimney where the heat will be wasted. Make your ash-box deep and keep it

clean so as to allow free access of air in ample quantity, and see that the grates are of such a pattern as will admit the most air possible to the fire, and see that they are kept clean. Then cut your wood short enough so that it will lay cross-wise in the arch, and cut it a foot shorter than the length of the fire-box. Split it fine, and then, when you build your fire lay a stick cross-wise near the back of the fire-box. Lay another stick cross-wise near the front of the arch. Spread a layer of sticks over these two. Put two more sticks cross-wise and add another layer, in cob-house fashion and so continue until the wood is within a foot of the bottom of the pan. Then close the door and breathe.

By this method the blaze will rise vertically, strike the bottom of the first pan, turn towards the chimney and hug close to the pans all the way and you will utilize all the heat that is produced, and no arch can do more. But, to make sure that it does so under all conditions, put a couple or three dampers in the arch so as to hold the blaze and heat at the bottom of the pan. If you use a tall chimney, with a strong suction draft, and pile the wood against the bottom of the first pan, the blaze will strike the bottom of the second pan at an acute angle, be deflected to the bottom of the arch, and will hurry along and escape up the chimney and a large portion will be lost. Bear in mind that I am speaking of a brick arch and flat bottomed pans. The boiling outfits in the room below are constructed on different principles, and the rules that I have given do not fully apply.

Set your pans so they will rest perfectly level on the arch and keep them so. Keep them clean from all accumulations of soot on one side and of niter on the other. It may require elbow grease, but do it if you plan to make a high grade of sugar. You cannot make a high grade of maple products unless you do do it. Run your sap into the front pan and work it back, and syrup off in the back pan, and syrup off often. Keep the sap just as shallow in the pans as is consistent with safety. The shallower it is the more rapidly it will evaporate, but not only this. The moisture escapes from the sap in the form of bubbles of steam which rise from the bottom of the pan. These bubbles, as they form, inclose themselves in a film, something after the fashion of a soap bubble. This film must either burst or be overturned before the steam can escape. Meantime, the steam inside, crowds the sap away from the bottom of the pan, and the thin layer of sugar which adheres to the pan, becomes slightly scorched, or changed to caramel,

and this also colors the product. Now, the deeper the covering of sap above these bubbles, the more the resistance the steam will have to overcome before bursting the film, the more caramel will be formed, and the darker will be the product. This Beauce county sugar, in addition to its being boiled in a cast iron kettle, was also produced by deep boiling. So I say again, keep your sap and syrup as shallow when boiling as is consistent with safety.

Maple sap as it comes from the tree is as clear as the clearest water. But it darkens somewhat under the influence of sunlight. For this reason, if for no other, it is best to use covers, if a high grade product is desired. And the sap is also as susceptible as milk to bacterial influence. And these bacteria not only darken the color of the maple products, but they produce other undesirable changes in the composition of the sap, which are closely associated with the flavor. It is not necessary to go into details in this matter. But the development of these bacteria must be prevented. And this can only be done by absolute cleanliness, and by keeping the sap at a low temperature, and by reducing it to syrup at the earliest possible moment. The last is accomplished by hustle, and plenty of it. The next to the last by the plentiful use of ice, and the first by the closest attention to all the details of cleanliness. The pans and gathering tank must be washed and scoured every night. The storage tanks must be washed as often as empty, and if emptied every night so much the better. The buckets must be gathered after every run, brought to the sugar house, washed thoroughly, scalded, dried and returned to the trees. And every utensil used in connection with the business, must be washed and scalded repeatedly. And the pans must be skimmed and wiped constantly. In fact, if a high grade product is to be made, the maple sugar maker must pay just as close attention to all the details of cleanliness as the dairyman who makes a gilt-edged grade of butter.

But mind what I say. All this costs time and money and hard work. It adds to and may double the cost of the product. And don't you do it or attempt to do it if you intend to sell your product to the blender in competition with this grade of Beauce county sugar.

Boil your sap till its temperature reaches 219 degrees. Pour it into deep buckets and let it stand till all the niter has settled to the bottom. Then, when ready, pour off the syrup and standardize it at exactly 219 degrees. Test your thermometer by immersing the bulb in boiling water, noticing the exact figure which the mercury indicates, and

adding seven to that figure. That will indicate the temperature to which your syrup must be standardized. It is said that the use of a hydrometer is a more accurate method of determining the density of the syrup. It is, when dealing with cold syrup, but it is inconvenient to use in the shallow boiling sap, and if care is taken that neither sugar nor niter becomes incrusting on the glass bulb, the thermometer so tested will give perfect results.

If maple cream is the product desired, boil till the temperature reaches 230, or a little higher. Then pour small quantities into shallow pans. Set them on snow or ice and cool them as rapidly as possible and without stirring down to a temperature of 90 degrees. Then clamp the pans to a table, and stir the sugar vigorously, keeping it well scraped down from the sides, until the temperature is still further reduced to sixty degrees. This is a man's job, and when the product has reached this density it will probably be too hard for further stirring. Then warm it until it can be easily manipulated and then pack it in the containers. If sugar is the product desired, cook to a temperature of 235 or more, according as a soft or hard sugar is wanted. If it is desired to make a product as hard as this Beauce county sample, cook to a temperature of 250, that is as far as it is safe to boil it directly over a fire. Then interpose a piece of thick sheet iron between the pan and the fire and cook very slowly. If boiling on a stove instead of an arch, cover the stove with the griddles. If boiling in a cast iron kettle, as this was probably boiled, cook to about the same temperature, or until the sugar will break like glass when placed on the snow. Then allow to fire to burn out slowly, and die down gradually until cool, and then dip the sugar into the molds. The slow heat brings it to the required temperature gradually dries out the moisture, leaving the hard product that you see.

The grain of maple sugar is influenced largely by manipulation while cooking. So stir the sugar after its removal from the fire, until the desired grain is produced.

Now, in closing, I just want to say that if I have wearied you old veterans by a repetition of what you already knew, this talk was not intended for you who make or can make the goods which are displayed on the tables, but for those who do not make maple sugar because they think they can't. And I say to them that I want to see them get a hump on themselves, and get out into the sugar place and win back some of the money they lost by playing that blown up industry with the swelled head that people call the Dairy Industry.

BUSINESS SESSION,**Thursday, Jan. 16th., 4 P. M.****Held in the Parlor of the New Sherwood House.**

PRES. CHAPIN:—On account of the congested conditions at the Armory it has been thought best to hold this session at this place instead of in the large hall at the Armory, and I believe that sufficient notice has been given so that all who wished to attend are present. I believe the first thing to come before the meeting is the report of the secretary, Mr. Ormsbee.

MR. ORMSBEE:—My report was presented at the full meeting on Tuesday afternoon, and the reporter now has the manuscript. I have a copy, however, and can read it if desired.

PRES. CHAPIN:—We will listen to the report of the treasurer, Mr. Purington.

MR. PURINGTON:—My report covers the receipts and expenditures from December 8th, 1917, which is the date upon which I assumed the duties of this office until, and including December 12th, 1918, at which date final settlement was made with the auditor of the Association, and is as follows:

RECEIPTS.

1917, Dec. 8th From C. O. Ormsbee,	
Check	\$150.00
1917, Dec. 19th From C. O. Ormsbee,	
Bal. in Treas.	52.60
1918, Jan. 4th From State Appropriation	500.00
1918, Jan. 8th From L. A. Hazen, Labels	5.00
1918, Jan. 8th From New Sherwood, Rebate	6.50
1918, Feb. 11th From C. O. Ormsbee,	
Memberships	74.00
1918, Feb. 11th From C. O. Ormsbee,	
Sugar	2.00
Feb. 11th From L. L. Story,	
Membership	1.00

Dec. 10th From A. M. Best, Membership	1.00
Dec. 11th From C. O. Ormsbee, Check	150.00
Total Receipts	<u>\$942.10</u>

EXPENDITURES.

EXPENSES OF CONVENTION.

1917, Dec. 8 Sherwood House, Entertainment	\$ 62.50
1918, Jan. 11 L. A. Hazen, Speaker	13.66
Jan. 11 M. F. Goddard, Speaker and Judge	15.00
Jan. 11 Mrs. John B. Chase, Speaker	8.64
Jan. 11 M. Collins, Trucking	5.70
Jan. 11 Howard Relief Hall, Rent and Damage	22.02
Jan. 23 V. I. Spear, Speaker	9.29
Jan. 23 Susan A. Nott, Reporting	30.85
Oct. 31 Mrs. John B. Chase, Judging	2.00
Total Convention Expenses	<u>\$169.66</u>

EXECUTIVE EXPENSES.

1917, Dec. 19 P. B. B. Northrop, Auditor, 1917,	3.36
1918, Jan. 11 C. O. Ormsbee, Secretary and Treasurer	27.80
Jan. 11 C. O. Ormsbee, Express and Postage	25.81
Dec. 12 C. F. Purington, Treasurer and Expenses	6.18
Dec. 12 P. B. B. Northrop, Auditor, 1918	4.56
C. O. Ormsbee, Expense and Salary	72.39
Dec. 10 Capital City Press	5.62
Total Executive Expense,	<u>\$140.10</u>

 PRINTING AND STATIONERY.

Jan. 23 Buswell Book Store,	
Record Book	\$ 2.25
Jan. 23 Buck Printing Co., Labels	2.25
Oct. 31 Buck Printing Co., Labels	47.89
Oct. 31 Capital City Press	5.00
Dec. 10 McAuliffe Paper Co.,	7.33
Total Printing and Stationery	\$ 70.34

PREMIUMS.

Jan. 23 Class A.	\$ 25.00
Jan. 23 Class B.	25.00
Jan. 23 Class C.	10.00
Jan. 23 Class D.	7.00
Jan. 23 Class E.	242.00
Jan. 23 Class F.	62.00
Total Premiums	\$371.00

MISCELLANEOUS EXPENSES.

Dec. 8 J. P. Spear, Syrup	\$ 8.25
Oct. 31 Edward O. Newell, Sugar	1.50
Total Miscellaneous Expense	\$ 9.75
Balance in Treasury	181.25
Total Expenditures	\$942.10
Total Receipts	942.10

PRES. CHAPIN:—You have heard the report of the treasurer, What is your pleasure in regard to it.

MR. MARONY:—I move that the reports of the secretary and treasurer be accepted.

Motion seconded and carried.

PRES. CHAPIN:—The next business to be transacted is the election of officers. Will you please nominate someone to serve you as president?

MR. SPEAR:—In view of the limited amount of time now at our disposal, and of the further fact that the present board of officers have served us satisfactorily during

the past year, I move that the present board, inclusive, consisting of

President,	H. B. Chapin	of Middlesex
1st Vice-President,	C. E. Martin	of Rochester
2nd Vice-President,	C. H. Colvin	of Rutland
Secretary,	C. O. Ormsbee,	of Montpelier
Auditor,	P. B. B. Northrop	of Sheldon

Be elected to serve during the coming year.

Nomination seconded, vote taken, and entire ticket elected unanimously.

PRES. CHAPIN:—Is there any other business to come before the meeting at this time?

MR. ORMSBEE:—Mrs. A. F. Coville, of Andover, has sent us five gallons of maple syrup to be entered in Class A. which class calls for five gallons of maple syrup and fifty pounds of maple sugar. There is no class in which this exhibit can be entered. I have attempted to reach Mrs. Coville by telephone, but have been unable to do so. What action should be taken in regard to this exhibit?

MR. SPEAR:—I move that we buy the syrup at the rate of three dollars a gallon, and allow her a special premium of five dollars, provided this is satisfactory to her.

Motion seconded, vote taken and motion carried.

MR. ORMSBEE:—I move, at our next meeting, we offer special premiums aggregating two hundred dollars, for the largest and best exhibits of maple confectionery, as follows:

\$100.00	for first premium
\$ 50.00	for second premium
\$ 25.00	for third premium
\$ 15.00	for fourth premium
\$ 10.00	for fifth premium

with the exact rules to be formulated later by the executive committee. This I will say is not intended to be offered permanently, but only for our next meeting.

MR. MARONY:—That will be a pretty heavy tax on our resources.

MR. ORMSBEE:—We shall have that amount of money to spare next season, unless some unforeseen expenses arise.

MR. MARONY:—I don't see how you can make that out.

MR. ORMSBEE:—Our premiums last year amounted to 371 dollars. This year they amount to but 225 dollars. There is a surplus of 146 dollars. Besides this, last year we donated our sugar and syrup to the Red Cross. This year we shall sell it, and the proceeds will more than make up the 200 dollars. Besides, unless we take some steps other than have been taken in the past, we shall have no display exhibits in either Class A or B.

MR. SPEAR:—I move that the matter be referred to the executive committee, for their consideration.

Motion seconded, vote taken and motion carried.

MR. MARONY:—I would like to inquire about the time and place of holding our next meeting.

MR. SPEAR:—That is a matter that has always been left with the executive committee.

MR. CHAPIN:—Is there other business to come before the meeting at this time? If not, the meeting stands adjourned.

The chair hears none, and the meeting is adjourned.

PREMIUMS AWARDED.

SWEEPSTAKES CUP.

J. P. Spear.....West Newbury

This is the third consecutive time that this cup has been awarded to Mr. Spear, and it now becomes his property, permanently.

CLASS A.

LARGEST AND BEST DISPLAY OF MAPLE PRODUCTS.

C. H. Colvin, West Rutland,.....\$25.00

CLASS B.

MOST ARTISTIC DISPLAY OF MAPLE PRODUCTS.

J. P. Spear, West Newbury\$25.00

CLASS C.

BEST MAPLE SUGAR CAKES, NOT LESS THAN FIVE POUNDS.

		Score	Premium
1st	Mrs. Lewis Walker, West Rutland,	97	\$5.00
2nd	Mrs. E. O. Newell, West Wardsboro,	96½	4.00
3rd	Mrs. Nellie Colvin, Danby,	96	3.00
4th	L. E. Cook, Cambridge,	94	2.00

CLASS D.

BEST EXHIBIT OF MAPLE CREAM, NOT LESS THAN FIVE PACKAGES.

1st	M. G. Lamson, Montpelier,	98	\$5.00
2nd	H. B. Chapin, Middlesex,	97	3.00
	Tie		
2nd	L. L. Story, East Fairfield,	97	3.00
4th	Mrs. E. O. Newell, West Wardsboro,	94	2.00

CLASS E.

MAPLE SYRUP SINGLE GALLONS IN GLASS OR TIN.

Premiums to be paid pro rata on all exhibits scoring 90 or more.

	Score	Premium
Martin Bromley, Danby	97	\$7.00
Mrs. Martin Bromley, Danby	97	7.00
N. E. Colvin, Danby	96	6.00
Mrs. Nellie Colvin, Danby	96	6.00
C. H. Colvin, Rutland	96	6.00
M. E. Chapin, Middlesex	98	8.00
L. E. Cook, Cambridge	93	3.00
M. G. Lamson, Montpelier	97	7.00
Joseph Graveline, Newport	93½	3.50
Martin Prindle, St. Albans	97½	7.50
Mrs. Geo. Ladeau, St. Albans	97½	7.50
Wm. A. Walker, West Rutland	98	8.00
H. J. Hewitt, Bristol	93	3.00
Dolphus Perry, Fairfield	95	5.00
F. E. Spear, West Newbury	97	7.00
Mrs. R. N. Spear, West Newbury	97	7.00
C. W. Collins, Strafford, ...	96	6.00
Mrs. W. H. Collins, Strafford, ...	96	6.00
Guy Magoon, Newport, ...	96	6.00
Eugene Perley, Richford, ...	97	7.00
Zoe B. Marcette, East Fairfield, ...	94½	4.50
J. Armida Marcette, East Fairfield, ...	94½	4.50
Mrs. E. O. Newell, West Wardsboro, ...	96½	6.50

CLASS F.

MAPLE SUGAR IN TEN POUND PAIL OR TUB.

Premiums paid pro rata on all exhibits scoring 90 points or more.

	Score	Premium
N. E. Colvin, Danby, ...	96	\$6.00
L. E. Cook, Cambridge, ...	96	6.00
Guy Prindle, St. Albans, ...	95	5.00
Martin Prindle, St. Albans, ...	95	5.00
Lewis Walker, West Rutland, ...	97	7.00
E. E. Perley & Son, Richford, ...	97	7.00
J. R. Whitcher, Groton, ...	93	3.00

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Foster, W. H.....	Calais, Vt.	Hayes, M. W.....	Strafford, Vt.
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 Myott, John.....Montgomery, Vt.
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 Orr, Wm. J.....East Ryegate, Vt.
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Taft, John	Brattleboro, Vt.	Warner, G. F.,	Chester Depot, Vt.
Tanner, H. E.	Marshfield, Vt.	Waterhouse, C. E.,	Craftsbury, Vt.
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Thompson, J. F.,	East Corinth, Vt.	Wheaton, Chas. J.,	Passumpsic, Vt.
Thorburn, Andrew...	Norwich, Vt.	Whitehill, E. M.	Derby, Vt.
Thurber, N. E.,	West Halifax, Vt.	White Enos R.,	West Rutland, Vt.
Tietz, Wm.	Richmond, Vt.	Whitcher, J. R.	Groton, Vt.
Tiftt, Edgar F.	Dorset, Vt.	Wilber, Frank	Rochester, Vt.
True, W. W.	Newport, Vt.	Wilber, Seth.	Moretown, Vt.
Tuller, Fred V.	Tunbridge, Vt.	Wilbur, B. L.,	
Turner, T. A.	Weston, Vt.		North Montpelier, Vt.
Tuxbury, W. H.,		Wilcox, F. H.,	East Brookfield, Vt.
	West Newbury, Vt.	Wilder, L. O.	Middlesex, Vt.

V

Vall, Homer W.	Randolph, Vt.	Winn, S. E.,	
Vall, Theo. N.,			West Chesterfield, N. H.
	Agricultural School & Farms,	Wood, Geo. M.,	Waterbury Ctr., Vt.
	Lyndon Ctr., Vt.	Woodruff, W. S. & Son,	
Vt. Farm Machine Co.,			Cambridge, Vt.
	Bellows Falls, Vt.	Wright, Arthur,	
			R. F. 2, Bradford, Vt.
		Wright, W. J.,	
			Montgomery Ctr., Vt.
		Wright, Carlos & Son,	
			Bradford, Vt.

W

Wade, A. P.	Moretown, Vt.	Wyman, Ned W.	Cambridge, Vt.
Walbridge, Mrs. E. P.	Cabot, Vt.	White, Enos R.,	West Rutland, Vt.
Walbridge, E. P.	Cabot, Vt.		
Walbridge, Earl M.,	Marshfield, Vt.		
Walbridge, F. M.	Cabot, Vt.		
Walbridge, Maurice, ...	Cabot, Vt.		
Walker, B. J.	West Rutland, Vt.		

Y

York, William E.,	
	R. F. D. 4, Bristol, Vt.
Young, J.,	R. F. D. 4, Orleans, Vt.

PROCEEDINGS

of the

Twenty-Seventh Annual Meeting

of the

Vermont Maple Sugar Makers' Asssocation

Held in Conjunction with the Fiftieth Annual Meeting

of the

Vermont Dairymen's Association

In the Gymnasium of the
University of Vermont

BURLINGTON, VERMONT

January 13th, 14th and 15th, 1920



ST. ALBANS, VT.
ST. ALBANS MESSENGER CO. PRINT.
1920.

OFFICERS.

President.....C. A. BADGER, East Montpelier
First Vice President.....V. I. SPEAR, Randolph
Second Vice President.....C. H. COLVIN, Danby
Secretary.....M. J. CORLISS, Berlin
Treasurer.....L. L. STORY, East Fairfield
Auditor.....P. B. B. NORTHROP, Sheldon

EXECUTIVE COMMITTEE.

H. N. HOSKISON.....Cuttingsville
S. H. STRONG.....Fayston
J. A. GRIGGS.....North Troy

PROCEEDINGS
OF THE
TWENTY-SEVENTH ANNUAL MEETING
OF THE
Vermont Maple Sugar Makers' Association

THE GYMNASIUM, UNIVERSITY OF VERMONT,
BURLINGTON, VERMONT.

January 13, 14, 15, 1920.

The 27th Annual Meeting of the Sugar Makers' Association convened at 2 o'clock, January 13th, Secretary Ormsbee presiding, account absence of President Chapin.

INVOCATION.

REV. C. J. STAPLES, BURLINGTON, VERMONT.

God of the snowstorm, God of the sunshine, grant that we may be kept true to Thy purpose in us and Thy thought in our higher life; grant that as we gather here we may learn the lessons of Thy providence and understand the more deeply the laws of Thy creation. In the midst of the confusion of the times, O God, give unto us Thy guiding Light, the Light of Truth, the Light of Honor, the Light of Service, the Light of Fidelity. Grant unto us strength and wisdom that we may care for all things Thou hast given into our keeping,—the members of our home and fireside; those with whom we associate in our business, and the creatures of the field. Our Father, grant that we may wisely use the instruments Thou hast placed in our hands, that we may grow in goodness. Make us mindful of the soul within; that we may be steadfast in our allegiance to the things that are pure and honest; grant us to realize that all we possess is but loaned us for a season, by the use of which we may unlock some of the secrets of Thy creation. Protect our land, Great God! Give unto our leaders the principles of righteousness and of faith. When Thou art done with us here, give unto us the hope of a larger service, a higher wisdom and a finer faith in the life beyond. In the name of the Master we ask Thy blessing upon us. Amen.

ADDRESS OF WELCOME.

MAYOR J. HOLMES JACKSON.

*Members of the Vermont Dairymen's Association and of the
Vermont Maple Sugar Makers' Association:—*

This City is again honored in having the joint annual meeting of your Associations held here. The many annual conventions and other meetings held in this City is proof that Burlington is at least a convenient place for such gatherings. We have not yet a convention hall but you and others find quarters which I hope are fairly suitable.

The members of these two Associations are among Vermont's most worthy citizens. You not only speak well of the State, but you do much to advance its best interests. Vermont maple sugar is the standard everywhere; it has no equal. This is an important industry and I hope the maple orchards will not be cut down. The dairy industry in the state also brings Vermont to the front wherever its products are displayed.

We hear it often said that Vermont is noted for men, women and maple sugar. We must add her dairy products, making four things for which the Green Mountain State is noted.

On behalf of the City I extend to you, and each of you, a most cordial welcome. I hope you find here a place suitable for your meetings and your exhibits. I also hope you will find here a people who appreciate your visit, and who value your endeavors to advance these two great industries, which you so ably represent at this meeting.

RESPONSE TO ADDRESS OF WELCOME.

LIEUTENANT GOVERNOR, MASON S. STONE.

*Your Honor, Mayor Jackson, Members of the Vermont
Maple Sugar Makers' Association:—*

In this beautiful city and on this auspicious occasion, I desire to make acknowledgement of the words of welcome extended by His Honor, Mayor Jackson, and to express the appreciation of the members of this association to whoever has made it possible to hold the meetings this year in such a beautiful building,—the Gymnasium of the University of Vermont. I have been a member of this society for some-time and I recognize in the industry certain great possibilities; if there can be unified action, Vermont will be able to place herself in the foremost ranks in some of her specialties. We have various things in this State that advertise it; take Vermont's granite, her marble, her scales, her organs; but if you observe, those industries to a certain extent are local industries. Maple sugar is distributed throughout the commonwealth; therefore, here is an industry, next to dairying, that represents the interests of the people of Vermont, and all that is necessary is a definite campaign of advertising to bring much larger returns from the maple orchards than is now yours. I believe there is a splendid future not only for maple products but for the dairy products of Vermont.

SECRETARY'S ANNUAL REPORT.

BY C. O. ORMSBEE.

The one question regarding the annual meeting of this Association, that, perhaps, is asked more often than any other, is, Why do you always hold them in Burlington? Why do you not hold them in various parts of the State, and thus give other towns a fair showing?

The reason is this: For a number of reasons it has seemed expedient to hold them jointly with the meetings of the Dairymen. It has been the consensus of opinion of practically all members of both Associations. This being the case, it becomes necessary to hold the meetings where we can have ample accommodations in the way of a hall for our discussions, rooms for our exhibits of butter and sugar and, also, space for our exhibits of machinery. And, more than all else, we must have ample hotel accommodations. Neither sugar makers nor dairymen take kindly to the idea of coming to these meetings and then being billeted out among private families, or being huddled together in improvised beds with six or eight or even ten in a room, as has sometimes been necessary when the joint meetings have been held in some of the smaller towns.

Now Burlington is the only city in the whole State having ample facilities along these lines. The only other city having any where near adequate facilities is Montpelier, and, even in that city, the only hall adequate for the purpose was not available at this time, it having been engaged by another organization, and fully a year ago. Hence there appeared to be no other alternative. And before any town complains about not having its just proportion of these meetings, it should provide such facilities as will make it possible to hold our meetings elsewhere than in Burlington.

And now I want to say, that, to those who have made sugar during the past season, it has been by far the most profitable of any season ever experienced in the whole history of maple sugar making. To be sure wages have been high, and, consequently, cost of production has been correspondingly high. But the price received for the product has been relatively a good deal higher. Back in 1892, about the time this Association was organized, the regular price of labor during the maple sugar season, was twenty dollars a

month. Today it is pretty well up towards fifty dollars a month, or two and one half times as much. But, the same grade of maple sugar that then found a slow sale at five cents a pound, is now greedily snapped up at twenty-five cents a pound, or five times the former price. And, primarily, you owe the greater part of that increase to the publicity given through the influence of this Association.

I am asked why we do not advertise our meetings in the newspapers. Well, what do you expect of your secretary? We advertised in three issues of the New England Homestead, and the Country Gentlemen gratuitously published a directory of the farmers' associations that were to meet during the month of January, and, as a result of these notices, I had, up to Saturday night, received 102 letters which required either an answer or a report or both, and there was a grand total of twenty-two cents in postage inclosed. I have sent out one thousand circulars requesting the delinquents to pay their dues and asking others to join the Association. In these circulars I stated that the secretary was ready, as far as possible, to answer all questions relating to the maple sugar industry. As a result of this statement I received eighty-eight letters asking for advice, and some of them required quite extended replies. Now, if we do a lot of extensive advertising, who is going to do the correspondence?

In some respects the past year has been a very successful one for the Association. In other respects, it has shown a sharp decline. We begin the new year with a larger balance in the treasury than ever before. And we have taken in a good many new members. But there has been a decided falling off in paid memberships. I have written something like fifty personal letters in an attempt to learn the cause of this. Many of these letters remain unanswered. But of those who did answer, the great majority stated that they were not intending to make maple sugar the coming season, and so did not feel disposed to keep up their dues. One, however, was candid enough to say that he had enough labels on hand to last two years, and, when they were gone, he would again join the Association. I also received a reply to another letter, telling me that the party to whom it had been addressed had permanently removed to a region where the temperature was not favorable to the manufacture of maple sugar, but the reason was not on account of scarcity of fuel.

In closing I will merely say, that, heretofore, our policy has been chiefly one of improvement in quality of product, of publicity and of marketing. But we have now reached

a point where we are beyond the two last items. Publicity will avail us nothing unless we have the goods with which to fill our orders. And it is useless to study methods or problems of marketing when we already have a market ready to take all our product and allow us a high percentage of profit. And we have also reached a point where the market will stand a higher price, and we cannot hope to greatly increase our profits along that line. Our future policy, at least for a few years, must be along the lines of cheaper production. This can be accomplished by studying more economical methods of handling and concentrating the sap. By this I mean that our sugar houses must be more conveniently planned and located, thus eliminating to a large extent, the labor cost. And we must also study to increase the production. This can only be done by using our influence to prevent the destruction of our maple forests, to encourage the reforestation of denuded areas with maple trees, and to promote the utilization of the five million maple trees now available for maple sugar making purposes, but remaining idle.

TREASURER'S REPORT OF VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

FOR YEAR ENDING JANUARY, 1920.

RECEIPTS.

Balance on hand Dec. 12, 1918,	\$ 181.25
Jan. 17 C. O. Ormsbee,	150.00
Mar. 4 State of Vt. annual appropriation,	500.00
Nov. 25 Vt. Maple Sugar Makers' Market, sugar and syrup,	63.62
Total receipts for year,	\$ 894.87

EXPENDITURES.

CONVENTION EXPENSES.

1919.

Jan. 17 Hotel Sherwood, Officers' expenses,	\$ 47.05
Mar. 28 O. G. Crandall,	70.20
Apr. 8 H. B. Chapin,	22.02
Miss C. S. Smith, reporting,	25.92
Bernice M. Richardson,	2.70
Mrs. L. M. Andrews,	12.26
Nov. 25 V. I. Spear,	5.35
Total Convention Expenses,	\$ 185.50

PREMIUMS.

May 20 Class A premium,	\$ 25.00
Class B premium,	25.00
Class C premium,	14.00
Class D premium,	15.00
26 Class E premium,	137.00
Class F premium,	39.00
28 A. F. Courville, special,	20.00
Total premiums,	\$ 275.00

PRINTING.

Jan. 21	Brooks Bank Note Co., labels,	\$	74.97	
Nov. 14	Buck Printing Co.,		32.20	
Dec. 15	Capitol City Press, printing and stationery,		47.00	
	Total printing,		<u> </u>	\$ 154.17

EXECUTIVE EXPENSE.

Dec. 25	C. O. Ormsbee, postage and expense,	\$	64.03	
	C. O. Ormsbee, salary,		50.00	
	Total executive expense,		<u> </u>	\$ 114.03
	Total expenditures,		<u> </u>	\$ 728.70
	Balance on hand, Jan. 1, 1920,			166.17
			<u> </u>	\$ 894.87

C. F. PURINTON,
Treasurer.

AUDITOR'S REPORT.

I have this day examined the Treasurer's book of the Vermont Maple Sugar Makers' Association, presented by the Treasurer, C. F. Purinton, together with the vouchers which make up each item and find a balance in the Treasurer's hands as of January 1, 1920, of one hundred and sixty-six dollars and seventeen cents (\$166.17.)

P. B. B. NORTHROP,
Auditor of the Vermont Maple
Sugar Makers' Association.

The within account is a true copy of the Treasurer's book.

Attest,

P. B. B. NORTHROP,
Auditor.

SPOUTING SAP DIRECT.

FRANK TEER, RUTLAND, VERMONT.

The sap spouting system direct from the tree to the storage tub at the sap house is comparatively a new one.

We had a very nice second growth of maples situated on a rough, rocky and steep side hill, where snow was nearly always deep, which made it impossible to get around to gather the sap by team; so we decided to give up tapping it. In the fall of 1916 I heard of this system, and kept tracing it until I found out for certain where it was made and by whom, and purchased enough for 500 trees. This system was invented by Mr. W. C. Brower of Mayfield, New York, in 1905, and patented three years later. Mr. Brower told me that he was nearly three years working on it before he got it so that it was practical to use.

First, he began by soldering a number of lengths of pipe together tightly. He very soon found trouble and after experimenting a while he punched holes along the top of the spout every eight inches or a foot to admit air. Then his trouble ceased. He said he threw many hundred feet of pipe away.

This pipe is made of tin, leaded over, and is made in two sizes, one-third inch which is used for the branch lines, and three-quarter inch which is used for the main lines.

In the fall of the year we set our posts or stakes for the pipes. Where we use wire to hang the pipe on we set the posts two or three rods apart, sometimes ten rods, depending on the pitch. On all the main lines we use wire on which to hang the pipes. The wire that we use is plain fence wire and secondhand telephone wire, when we can get it. On branch lines common stove pipe is used. This wire must be stretched very tight, to avoid sags. This pipe comes in lengths of 4 feet 7 inches.

We have one main line 1,500 feet in length which brings two orchards together. All along this main line we attach our branch lines and other branch lines come on to these branch lines.

As we enter the woods we plan where we will have our main branch lines run. Here we use our smaller sized pipes. After this we stretch our small wire where we are going to run our main branch lines. On the smaller branch, which

runs into the main branch lines, we do not use any wire to hang the pipe but use small stakes and set them eight or ten feet apart. Sometimes we drive a nail under the pipe and bend it up over the pipe and hold it that way; other times we drive a nail through the hole where the spring goes in, when it comes right. These branch lines are connected to the main line by a "goose neck" as they are called. These "goose necks" will carry the sap of 150 spiles.

As you can see by the pipes, a "goose neck" can be put on almost anywhere, as the holes serve for two purposes; on one side of this hole is a lip which has two smaller holes to hold the spring in place, which is attached to the "goose necks" and spiles. By the use of the "goose necks" and the two-foot lengths of pipe, we can tap a tree any place we wish; we can go clear around the tree if we desire to.

We have found by experience that it is advisable to have the lines run on the east and south side of the trees, because when the sun shines in the morning it will strike the pipes and prevent them from freezing. If the lines run on the north and west side of the trees the early morning sun would have no effect on them.

We usually go over our lines in the morning when sap runs to see if they are all right; and during heavy runs we go more often.

We never have had any trouble since we put our main lines on wire except once, when a party who came to look over the system thought it would be a joke to put sticks and bark in the "goose neck" holes.

During the time we have used this system, we have had only three or four limbs strike the pipes. I have seen, in these same woods, buckets knocked off by limbs and spoiled; in fact more than 25 buckets blown off in a single hour. With the pipe system, during a season, we have never found over a half a dozen spiles out which is a very good showing when compared with buckets. In the height of the runs I have seen this larger sized pipe nearly full running into the tub. This is the amount of sap that is coming from 900 spiles. You can imagine we have to hustle to keep the sap boiling.

Last year we had only one good day's run and in spite of all I could do the sap came so fast that it gained an inch every hour for three hours.

The quality of the syrup is fine. All of our best goes to private trade and the remainder to the stores. I had planned on having some for the exhibit this year, but owing to losing shipments we had to refill several orders, and our stock is exhausted.

We use two large rigs, one 5 feet x 16 feet in one camp and one 5 feet x 18 feet in another. After a run, we take a tank full of water into the woods, and go to the ends of each branch and pour a pail of water through to cleanse the pipes. At the end of the season just as soon as the sap is through, we collect the pipes and wash them before they get sour. They are put into the evaporator which contains water and are boiled, Wyandotte powder being used in the water. After boiling they are removed by means of a hook, placed in a tank of water, where they are washed; the inside is cleaned by means of a swab on the end of a quarter-inch iron which is pushed through the pipes very thoroughly. Then they go into another tank of water and are rinsed and then placed on end and dried. When dry they are packed and put away until spring, at which time they are placed in the evaporator and scalded before being used.

I am very often asked, "Does it not take a very long time to put them out?" Three men (besides myself) can tap about 500 trees a day. I seldom ever do anything except to bore the trees and drive the spiles, as I prefer the benefit of my judgment in tapping the trees. I am now teaching one of my boys to do this. I will allow that it takes one-third longer to tap our bush by this pipe system than it did when we hung buckets and used covers, but there are a few things we can boast of, and they are; no more sap lugging, no buckets to run over, or to freeze and burst.

We are using 30,000 feet of this piping, which is equivalent to 1,700 buckets, besides using 400 buckets in places which will not run to the sugar camps.

As soon as these second growth trees are large enough we shall increase the pipe system. We estimate it will take about 1,400 feet to do the work of 100 buckets if the trees are anywhere near together. As the two orchards are so far apart, we have to use 1,500 feet extra pipe.

MR. PURINTON:—How much trouble is there in freezing?

MR. TEER:—I have no trouble whatever; if I put them on the south and east side of the trees, the early morning sun strikes them and quickly starts the sap running.

MR. PURINTON:—Does the apparatus burst in freezing?

MR. TEER:—No, it does not; I have used part of this outfit three years and part of it Mr. Brower sold me after using it ten years and it is nearly as good as that I have used three years.

MEMBER:—How much damage does falling of limbs do?

MR. TEER:—It does not drag the apparatus down very often; there is a "give" all the way in the wire.

MEMBER:—How much fall do you have to have?

MR. TEER:—I will illustrate to you—about like that.

MEMBER:—You have to have a continuous flow, don't you?

MR. TEER:—Yes, you must not allow any sags.

MEMBER:—What would be the life of one of these systems?

MR. TEER:—I can't say, I have not used it long enough; this has been in use 12 years. I think some of the pipe at our camp that has been used for ten years is practically as good as this that has been used but three years. When rust appears I arrange to have it leaded over,—the spots.

MR. ORMSBEE:—To start a new outfit, what would be the comparative cost in using this or using buckets?

MR. TEER:—This would be the cheapest. With this I can install for something like \$35 a hundred; buckets cost from 50 to 55 cents, and covers more.

MEMBER:—What is the size of your trees?

MR. TEER:—Second growth; anywhere from 8 up to 16 inches through.

MEMBER:—Are they close together?

MR. TEER:—In this bush they are. In orchards where the trees are very scattering it would not be advisable.

MEMBER:—Have you noticed any change in the quality of the syrup?

MR. TEER:—In the end of the season there is more or less of sour sap that we throw away, but with the present high price of sugar I should gather it.

MEMBER:—What is the comparative length of time in tapping with this and with buckets?

MR. TEER:—About a third longer with this system; I have two boys, men grown now, and myself; we usually hire one man,—will go out in the sugar camp and put out the same as 500 buckets in a day's time,—beginning at 7 and stopping at 5 at night.

MEMBER:—Do you take in your wire or leave it out?

MR. TEER:—I roll the wire up every season; I would not do this if I did not have cattle in the pasture (nearly all this bush is situated in the pasture); in the fall of the year I go around and drive the stakes; this year it was about half a day's work.

SOME NEW IDEAS IN CONCENTRATION.

BY C. O. ORMSBEE.

One can hear upon all sides the old story that it does not pay to make maple sugar. That the business is unprofitable, and a money-losing proposition. I heard that whine fifty years ago, and I have heard it here to-day. And I suppose that there are a great many men who have cried that whine so long and so often, that they have come to believe it themselves. And I suppose that is one reason why they allow five million maple trees to go untapped every spring. Well, let us see. Last spring a man in Montpelier, not being rushed with business along his own line, went back to the farm and rented a sugar orchard of 500 trees. The terms of the rental were as follows: The owner furnished trees, team, equipment and standing wood, and boarded the renter, and received one half the sugar. The renter did all the work, including the cutting of the wood, most of which was green, worked twenty-seven days, including two Sundays, made 1,460 pounds of sugar, of which he received 730 pounds. He reserved 30 pounds for his own use and sold the remaining 700 pounds for twenty-two cents a pound, the buyer furnishing packages, thus receiving 154 dollars for twenty-seven days' work. Now, if that does not pay, what upon earth do you call a paying proposition?

And now I want to make just one comparison. I made it last year and it seemed pertinent enough so that a dozen or more papers copied and republished it, and I want to make it once more.

Normally, and under normal conditions, and during a five years' average, this State produces maple products to the average of 1,306,000 dollars annually. Some years we produce more and some years we produce less. But that sum represents the average cash value of the sugar and syrup produced between the years 1914 and 1918, inclusive. We consumed a good deal of that product right here at home, but it is safe to assume that 1,000,000 dollars' worth went out of the State and returned in the form of cold cash. And of that sum, every dollar of it remained not only in the State, but practically every dollar of it remained right on the farm where it originated. And every dollar represented what would otherwise have been a waste product, combined with

labor that did not interfere in any way with any other farm occupation. So much for maple sugar.

And the average value of the total dairy products during the same period amounted to 16,800,000 dollars. To produce this sum, the farmers fed practically all the hay and grain and ensilage that they could raise, and bought from other states, grain and feed to the amount of 14,000,000 dollars, and phosphate to the amount of 3,500,000, making a total of 17,500,000 dollars. In other words, they sent out of the state 17,500,000 dollars in cold cash in order to produce 16,800,000 dollars of dairy products. Now then, which industry is of the most benefit to the State of Vermont, and especially to the farmers of Vermont? And which industry ought you to support?

The ways and means and methods of concentration of maple sap, while they may not of themselves form the most important factor in the economical production of the highest grade of maple products, certainly stand very high in the list of essential factors. I am showing you a sample of what is known as Beauce county maple sugar. It was produced in Canada, and it receives its name from the fact, that, but a few years ago, the greater part of the production of Beauce county, in the Province of Quebec, and not one hundred miles from here, was of that grade. And a great deal of the Canadian output is of this quality. Not all of it ranks with this sample, for many of the Canadian maple sugar makers are producing just as high a grade of maple sugar as the best maple sugar makers of Vermont can produce. I have seen maple products exhibited at the meetings of the Canadian Maple Sugar Makers' Association, maple sugar and maple syrup of just as high a grade as has ever been exhibited at any meeting of this Association. And I have seen genuine Vermont maple sugar in the warehouses of Welch Brothers, of Mr. Spear and of Mr. Cary, that ranked a good deal lower even than this. I have seen in New York, and in Michigan and Ohio just as high a grade of maple sugar as can be produced in Vermont. And, if you have the idea that Vermont produces better maple sugar than any other state, get that idea right straight out of your heads, for it is no such a thing. What gives Vermont her great prestige along this line is the fact that she produces a great deal higher percentage of a high grade product than any other state. And what gives Canada the unsavory reputation of producing a low grade of maple sugar is the fact that a very large percentage of her output is a low grade of maple product.

And right here I want to digress just far enough to

tell you that you need never fear that Uncle Sam, even if he wishes to do so, can ever, by any tariff or other regulations, bring a high grade maple product into competition with our own high grade products. For the total output of Canada, allows but three pounds to a person, of her own population. And the market value of high grade maple syrup and maple sugar in Quebec and Montreal and Ottawa and Toronto, and other large Canadian cities is greater than at any place in the United States. And, were it not for the Canadian tariff, which keeps our sugar out of Canada, that country would take a goodly share of our output. And you need not fear that there will ever be an over supply of maple products on the market. For the whole output of the world will not allow each person in the United States three quarters of a pound in any year. And a great many of us have eaten more than that amount in a single day. And, even by the utilization of all the maple trees in the world, it would not be possible to produce a sufficient quantity of maple sugar to allow each person in the United States two pounds of maple sugar in any year. And, to supply the State of Vermont, with its annual supply of sugar, according to its normal rate of consumption, would require one half of the world's total production of maple sugar. So much for over production.

But now let us get back to our original subject. Right here is a cake from the highest scoring exhibit of maple sugar cakes that is shown on these tables. Notice the difference. Now the sap from which the Beauce county cake was made, was, at one time, of just as good a quality, as that from which this high grade cake was made. And I have no doubt but that it was of just as good a quality when it was placed upon the fire. For there is no method by which a sour, or even a partially soured sap can be concentrated into a product as hard as this. More or less of it will refuse to grain and will remain in the form of a sticky molasses. So that the difference in quality must have resulted from a different method of evaporation, and nothing else.

Now, then, the sap from which this Beauce county sugar was made, was evaporated in a deep cast iron kettle and cold sap was added in sufficient quantities to cool the boiling mass, as often as the evaporation reduced to near the danger point. This cake of high grade maple sugar, so light colored that the uninitiated might swear that it is nine-tenths granulated sugar, was made by boiling the sap in a smooth, tin pan or evaporator, at a depth of not over one inch, and the waste was taken care of by the admission of a constant stream of hot sap of nearly the same density. And,

had it been twice filtered while hot and immediately returned to the fire and concentrated to its present density without being materially cooled during the operation, it would be several shades lighter.

These, then, are the chief factors of evaporation, so far as a high grade product is concerned. Keep your sap as shallow in the evaporator as is consistent with safety, and keep it always at the same temperature. Never cool it by the admission of a large quantity of cold sap, and never allow it to become cold or even cool from the time it enters the evaporator until it is drawn off as syrup. And, were it possible and practicable to remove the sediment and concentrate the sap to the density required for sugar at a single operation, a better grade of sugar would result. When you go home at night, leaving your evaporator full of sap in the process of concentration, and return in the morning and complete the concentration, the product is always of an inferior quality. I will make no attempt to explain this, for I do not know the reason. Neither do I believe that anyone else knows the reason. But the fact remains that the condition exists.

But the concentration results from the application of heat. This effects a physical change, whereby the water is expanded and transformed into steam. This takes place at the bottom of the pan, and the steam escapes in little bubbles which force their way through the sap above. In rising, they automatically form a little film, somewhat analagous in its physical characteristics to the film which incloses a soap bubble. Sometimes this film incloses the steam resulting from the evaporation of a particle of water, and sometimes it spreads like a blanket over the bottom of the pan and holds the steam down. But, in either case, the film is strengthened by the weight of the sap above. And it is strengthened just in proportion to the weight of the sap, which, in turn, is proportional to its depth. And, in neither case can the sap escape until it bursts that film. And, whenever a particle of water is transformed into steam, a vacuum is formed, which is inclosed upon one side by the bottom of the pan, and upon the others by the film. And that vacuum remains until the film bursts, the steam escapes and the sap rushes in and fills the space. And, while that vacuum exists, particles of sugar inside the space, and adhering to the bottom of the pan, will be scorched sufficiently to be transformed into caramel, which is really burned sugar,—a substance of a black color and an acrid flavor. This of course becomes disseminated through the boiling sap, to which it imparts its own color and flavor.

Now it is obvious, that, the greater depth of sap, the greater will be its weight and the more it will reinforce and strengthen the film. Consequently the more force will be required to burst the film, the longer time the inclosed steam will require to gain that strength, the longer time the vacuum will exist, the longer time the space upon the pan will be bare, the more caramel will be formed, the blacker it will become. Thus the greater will be its power of imparting a dark color and a strong flavor. And you see the result right here in the comparison of these two cakes. In the making of one the sap was never allowed to exceed one inch in depth, and the syrup when concentrating it to sugar was never allowed to exceed two inches. While, in the other, the depth at times exceeded two feet. And the result is plainly to be seen.

And there is one other point. If your pans are of bright, smooth, polished metal like tin or galvanized iron, or copper, or even the Russia iron of former days, comparatively little sugar will adhere, and the film will be thin and weak and easily broken. On the other hand, if you allow the pan to become roughened by an incrustation of the so-called niter, more sugar will adhere, thus allowing more caramel to be formed, the film will be thicker and stronger, thus requiring greater strength to burst it, and a longer time to acquire that strength. Moreover, it will fasten itself upon and around the little irregularities afforded by the surface of the niter and thus augment its strength. So that, in order to produce a high grade product, you must keep the interior of your pans clean and bright. You, of course know all this as well as I. You have learned it by experience. But there is nothing in the whole literature of maple sugar making that gives any hint as to why this is an absolute essential.

And now in regard to the fire. As I have already said, concentration is occasioned by the evaporation resulting from the application of heat. Now there are two kinds of heat. One is the slow, steady, intense heat that rises from a bed of coals, and the other is the quick, flashing heat that comes from a strong, bright blaze. The first changes a particle of water to steam by means of its own slow, steady heat, and the steam thus developed, bursts the film by means of a slow, steady pressure, and escapes very slowly, thus allowing more time for the caramelization to take place. The second forms steam with a flash. And the steam thus developed, strikes the film a sudden, strong blow, bursts it, and escapes in the least possible time, thus allowing but a short time for caramelization. So that, in the making of a high grade pro-

duct, another important essential is that the fire be built in such a manner as to produce a continuous blaze, instead of coaling down.

In order to do this, your wood must be dry and finely split. You can make sugar with coarse, round, green wood. But, if you attempt to make a high grade product with such fuel, you will find that you have a difficult proposition before you. So, see to it that your wood is fine and dry, and cut it short enough so that you can lay it crosswise in your arch. Use an arch with a deep fire box. I am not saying anything in favor of or against any style of arch here on exhibition. They are constructed upon different principles, and there is not one with as deep a fire box, within six inches, as I would suggest. Then, when you replenish your fire, lay a stick crosswise, and near the back of the fire box. Lay another near the front. Then pile just a single layer upon these sticks. Then place two more crosswise, and cover these with another layer, and so on, in cob house fashion, until the last layer is within six inches of the bottom of the pan. Then close the doors and breathe. Then get another pile of wood in readiness, and, by this time, the fire will need replenishing again. In order to make this grade of maple sugar, it will be all that any man can do to attend to the fire of one evaporator. Of course this will make the cost greater. But what of that. You will get it back in the increased value of the product. It is one of the letters that spell the difference between this grade at twenty cents a pound, and this grade at forty cents a pound. And I say just this. If you intend to sell your product to the blenders who want this grade, and who are buying all they can get from Canada; then attempt to make a high grade, but make a low grade and study to make is as cheaply as possible.

But now to get back to the fires. Let your ash pit be of ample size, and see to it that it is kept free from ashes, and that the doors remain wide open, so as to give an ample draft from below. Let the grate bars be small, and the grate flues small, but numerous, so as to give an ample, and widely distributed supply of air. With an arch so constructed, and with fires so built, the blaze will rise vertically, strike the first pan, or strike the evaporator very close to the front end, will turn at a right angle, hug close to the bottom of the pan, and follow it to the chimney. But, to make sure that it does so, see that the throat of your arch is very shallow or, what amounts to the same thing, insert dampers, as is done in some of the patent arches, to hold the heat next to the pans. And lastly in this connection, do not

build a high chimney. A tall chimney will create a strong suction draft, and that is something that you do not want. For economy of fuel, you must have a draft that is forced from the other end of the arch, and that will crowd the heat slowly along, and, at the same time, furnish sufficient oxygen to insure a complete combustion.

If you do use a tall chimney, and used coarse wood, piling it tightly to the pans, and neglect to provide an ample force draft, you will find that the blaze will strike the pans nearly midway of the arch, and at a sharp angle, and will be deflected downward, away from the pan and be drawn rapidly into the chimney, no matter what kind of an evaporator you may use. Bear in mind that heat is produced by the chemical union of the oxygen of the air with the carbon of the fuel. A given amount of carbon will combine with a given amount of oxygen, and it will use no more. And this combination will produce a given amount of heat and no more. And this heat, if utilized, will evaporate a given amount of water, and no more. And, when you utilize all the heat, you are getting all that it is possible for the given amount of fuel to produce. And the true test, as to whether or not you are doing this, is the temperature of your chimney, and not the number or extent of the corrugations in your evaporator. If your chimney is hot, you are wasting fuel, and, if it remains cool you are utilizing all the heat possible.

The Pure Food law requires that maple syrup shall consist of sixty-five per cent of sugar, and thirty-five per cent of water, and shall weigh eleven pounds to the gallon. You have found this to be the correct weight and proportions. If much heavier, portions will crystalize or grain. If much lighter, there will be difficulty in keeping it in storage. Either the scales or the hydrometer will tell us when the syrup has reached that density. But these are inconvenient to use when dealing with hot syrup in shallow pans, and so the thermometer is almost universally in use for this purpose. It is found, that, when the syrup has reached that density, it will boil at a temperature of 219 degrees. But this is calculated at an altitude of zero. That is, at sea level. As the altitude increases, it will boil at a correspondingly lower temperature, and so an allowance must be made for the height of the boiling plant above sea level. Approximately an allowance of one degree for every 500 feet must be made. To avoid inconvenience, this is done by testing and regulating the thermometer. Water boils at zero altitude at a temperature of 212 degrees, or seven degrees less than the boiling point of standard syrup. So, to test your thermometer, dip the bulb into boiling water. Note

the point indicated by the mercury and add seven to that figure. This will indicate the point at which your syrup should boil. Thus, if you are at an altitude of 1,000 feet, water will boil at a temperature of 210 degrees, and you should boil your syrup only to a temperature of 217, instead of 219 degrees.

But, even here there may be difficulties. The frequent dipping of the bulb into the hot syrup, and the sudden cooling thereafter, may, and often does produce a condition in the glass known as the permanent expansion. This increases the capacity of the bulb containing the mercury, and consequently causes your thermometer to vary. Again, there may be an incrustation of niter around the bulb which may cause a variation. Resting the bulb upon the bottom of the pan will also cause a variation, and a decided one in certain types. And, lastly, the thermometer will vary according to the barometrical conditions of the atmosphere. That is, just before a storm, when the atmosphere is light, and your wife complains that the potatoes boil dry, you will find that your syrup will also boil at a lower temperature. And your remedy for these variations is to watch your thermometer, and test it frequently and so make the proper allowances.

And now I want to speak briefly of other methods of concentration than the direct application of heat from a wood fire. And one method is by the substitution of coal for wood, as a fuel. I am not aware that this substitution has been made in Vermont, except in a few instances for reducing the syrup to sugar, and in some of the factories where the product is standardized or blended. In such cases it seems to give good satisfaction, and, so far as I can learn, the question seems to hinge upon the comparative cost of the two fuels. I have, however, letters from two parties in Pennsylvania who have tried it more or less extensively for concentrating the sap, and they speak quite enthusiastically of it, with the single exception that they have not been able to construct an arch which will handle it advantageously. From all that I can learn, it would seem that the arch must be constructed upon principles directly opposite to those that I have described. That is, the fire-box should be long and comparatively shallow, and the chimney should be of a greater height. The problem is well worthy of further experimentation, but the question must, as I have intimated, hinge upon the comparative cost of the two fuels.

Then we have the question of concentration by the use of steam. This scheme has been fairly well tried out in this State. All who have tried it speak well of the scheme,

though none are very enthusiastic over it, and I have not yet been able to induce any one to come here and give his experience. However, it seems that the cost of the plant is prohibitive unless it can be used for other purposes than the manufacture of maple sugar during two or three weeks in the year. Could it be used, I will say, in connection with a cider mill, and for the manufacture of one or more of the several forms of concentrated apple juice, steam might be used advantageously in the concentration of maple sap. The consensus of opinion seems to be in favor of a steam-jacketed tank, instead of the insertion of steam pipes.

Another scheme which appears to have considerable merit, is to boil the sap in a partial vacuum. This method is adopted exclusively in the manufacture of beet sugar. As adapted for the evaporation of maple sap, a tank of sufficient capacity to contain an entire run is used. The supply of sap is run into it. The cover is placed in position and hermetically sealed the air is exhausted, heat is applied and the evaporation is conducted at a temperature of from 120 to 140 degrees. A plant of this nature would be somewhat expensive, but there would be an immense saving in the cost of fuel, while the engine might be used for other purposes, and the product, with little or no skill in its manufacture, would excel anything now on these tables. On these accounts, it would seem as though an apparatus of this kind might profitably be installed in some of the larger orchards. But the evaporator of the near future will be a flatbottomed pan, divided by partitions into various compartments, and will be operated by gasoline for fuel. By this method the sap can be boiled at a less depth than is safe if any other fuel is used. There will, of course, be a considerable cash outlay for the necessary gasoline, but the cost of the wood will be eliminated and the labor of keeping the fires in good condition will be reduced to nothing. And, when an outfit of this kind is used in connection with the system of spouting the sap directly from the tree to the storage tank as described by Brother Teer, the labor cost of making maple sugar will amount to very nearly nothing. And the manufacturer who first places a boiling rig of this type, and induces some conservative sugar maker to use it will certainly rape a bonanza.

The first time I ever addressed you, I spoke of the possibility of sometime concentrating the sap by congelation, and stated, that, when it should be practicable to produce a syrup by freezing the water out of the sap, the finest possible product would result. You who have tasted the few drops left in the buckets when the sap had been frozen to a

solid mass, will appreciate the truth of this statement. Recently the Department of Agriculture at Washington has developed an apparatus for concentrating cider and other fruit juices by this method, and which would work equally well in concentrating maple sap, thus retaining the whole of the essence which imparts a flavor to the maple product, and a part of which is lost in the steam under the present process. I doubt if it can, as yet be carried far enough to produce grained sugar, but the maple syrup will have a highly concentrated maple flavor, and will be as clear and transparent as the purest water, and I have no doubt that it will find a ready market at a dollar a pint, when introduced. Briefly stated the process is essentially as follows:—

The sap is frozen to nearly a solid mass by chemical processes that are somewhat intricate and not necessary to be described at this time, but which are very similar to those employed in the manufacture of artificial ice. The ice is then passed through a crusher which grinds it about as fine as coarse sand. The crushed ice is then placed in a centrifugal machine, which revolves at the rate of 2,000 times a minute, and is inclosed in a cylindrical jacket and the syrup is thrown out and forced through minute holes in the shell of the machine, the ice remaining inside. This is the machine that is used in the beet sugar factories to separate the sugar from the molasses, and, with a very slight modification, is used in most laundries to wring the wet clothes. There seems to be a good deal of merit to this scheme, but it is probable that the cost of the plant will prevent its successful operation.

JANUARY 14, WEDNESDAY MORNING SESSION.

ADDRESS.

MR. D. M. WALSH, FOOD AND DRUG INSPECTOR, BUREAU OF
CHEMISTRY, U. S. DEPT. OF AGRICULTURE.

Mr. President, Ladies and Gentlemen:—

I am very glad that your President has told you that I am a Vermonter, for there are some things that I can say to you as a Vermonter that I might not feel it becoming to say as a Government official. I have always been exceedingly proud of the food products of our Green Mountain State and my experience as a food official has served to increase this pride in these products very much. Something of the fineness and delicacy of the limestone, and the strength and ruggedness of the granite of our native hills seems to find its way into these food products, and our fruits seem to me a little sweeter and better-flavored, and our grasses a little greener and richer, and our beeves and our fowls a little more nourishing and strengthening. Perhaps it is because I associate the memory of a boyhood appetite with these products that I think of them in this way, but always when I know I am eating Vermont maple sugar, or Vermont butter, or Vermont turkey there is an added zest to the feast. Indeed, I am tempted to paraphrase the lines of Omar and to wonder what our Vermont farmers buy one-half so precious as the things they sell.

The food products which the Maple Sugar Makers' Association and the Dairymen's Association are organized to promote are particularly typical of the Vermont farm products which I have mentioned. Upon the output of our maple sugar industry and our dairy industry a good part of the fame of Vermont as a source of excellent food products rests. These products are rapidly coming to be recognized as real luxuries and I am glad to see, from the exhibits here at your convention, that there seems to be a movement to market them in packages and in a form in keeping with their splendid merits. I, personally, know of firms in Boston that are paying a premium of several cents a pound for the butter output of certain Vermont creameries whose managers have learned how to cater to the fancy trade, and

I dare say that the manufacturers of maple products who are putting them on the market in suitable form are reaping a commensurate financial return. This return, I believe, will never be lacking when the natural excellence of our products is supplemented by skillful manufacturing methods and attractive market packages.

My particular mission in coming before your Convention today as a food official is to assist you, if I can, in your efforts to have your maple products and your dairy products conform to the National Pure Food Law.

It will not be necessary for me to dwell especially upon the adulteration of Vermont maple sugar and syrup, as I believe this adulteration is practically non-existent. I have not come across a prosecution under the national law against a Vermont farmer for shipping adulterated maple sugar or syrup during the past ten years. When you consider the ease with which this product may be adulterated, either by insufficient evaporation or by adding cane or other sugars or syrup to it, this record is very commendable.

There is one respect, however, in which the Vermont farmers are not complying with the law in respect to the packing of maple products and it is this point that I have come here in particular to emphasize. You are not, as a rule, declaring the net contents on your packages of maple sugar and syrup. The Food and Drugs Act was amended on March 3, 1913, so as to require that "The quantity of contents, in all cases of food, if in package form, must be plainly and conspicuously marked, in terms of weight, measure, or numerical count, on the outside of the covering or container usually delivered to consumers".

It has been the policy of our Department to secure compliance with this requirement of the law by education and publicity, and ever since the amendment was adopted we have been circularizing packers of food products and running articles in daily papers and trade journals to inform these interests of the law. In the case of large manufacturers, we have been almost uniformly successful in getting them to declare the quantity of contents on the packages of food which they put out. But in the case of growers of vegetables and farmers and small dealers generally who ship food in package form, we have not been so successful. There has, however, been a great improvement lately, but shippers of maple products, particularly the farmers, have almost uniformly failed to declare the quantity of contents on their packages. We, members of the Boston station of the Bureau of Chemistry who have charge of the enforcement of the National Law in New England are greatly concerned

about this, as we realize that now, after more than five years of propaganda work to inform the trade of the law in respect to this matter, prosecutions of those who fail to comply with it may start at any time. We have sent circulars to all of the manufacturers of maple sugar and syrup in Vermont that we could learn of, setting forth the requirements of the law in regard to declaration of quantity of contents and, as I said before, my particular mission here is to inform you of this matter.

You will note that the regulations require the quantity of contents to be stated on the outside of the covering or container of food in package form. The statement must be plain and conspicuous. Regulations further require that "Statement shall not be a part of, or obscured by, any legend or design, and shall be so placed and in such characters as to be readily seen and clearly legible when the size of the package and the circumstances under which it is ordinarily examined by purchasers or consumers is taken into consideration".

The regulations also require that "If the quantity of the contents be stated by weight or measure it shall be marked in terms of the largest unit in the package; for example, if the package contains a pound, or pounds, and a fraction of a pound, the contents shall be expressed in terms of pounds and fractions thereof; or pounds and ounces, and not merely in ounces". Other regulations are that "Statements of weight shall be in terms of avoirdupois pounds and ounces statements of liquid measure shall be in terms of the United States gallon of 231 cubic inches and its customary subdivisions; i. e., in gallons, quarts, pints, or fluid ounces, and shall express the volume of the liquid at 68° F." "The quantity of solids shall be stated in terms of weight and of liquids in terms of measure unless the package be marked by numerical count and such numerical count gives accurate information as to the quantity of food in the package".

Briefly, the law simply requires that you state the quantity of the contents on your maple sugar and syrup packages plainly and conspicuously. In the case of liquids you should use gallons, quarts, pints and fluid ounces as units of measure and state the contents in terms of the largest unit in the package, as "One quart", or, in case the package does not contain an even unit, then in terms of the largest unit and the next smaller unit, and "one quart, four fluid ounces", or "one pound, four ounces" in the case of solids, or, if you prefer, you can declare the contents in terms of the largest unit and fractions thereof, as, "one and one-fourth pounds".

I realize how difficult it is going to be for farmers to

label their packages of maple syrup and sugar as to quantity of contents. Most of the producers ship their product in naked tin cans without labels, labels do not readily adhere to tin cans, and there is always a rush and a scarcity of help in sugaring season. If preparations are made in advance, however, these difficulties should not be insuperable. My suggestion is that your Association arrange with the manufacturers who supply the cans for maple syrup and the pails for maple sugar to press a statement of the quantity of contents in the tin at the time these containers are made. As these products are usually shipped in packages holding one unit of measure, so such legend as "Net contents one quart" in the case of syrup or "Net contents one pound" in the case of sugar would be satisfactory.

If you adopt this suggestion I want to urge you to arrange with the can company to make your cans large enough. The law requires us to take the volume of liquid at 68°F, so that if a can is filled when the syrup is hot, and will hold only a gallon, there will be less than a gallon when the syrup cools to 68°F, as the syrup shrinks in volume on cooling. This should be allowed for in determining the size of can to use.

As to dairy products. We have found some adulteration of dairy products but the greater part of these adulterations are, I believe, due to carelessness rather than to an intent to deceive the consumer.

One of the forms of adulteration is low milk fat content in butter. Our standard for butter requires that it contain 82.5% of milk fat. We occasionally find butter running around 80% milk fat or less, due to having too much moisture or too much salt incorporated in it. You will readily see that if the moisture runs over 16% and the salt over 2% the milk fat content is bound to be low. The only remedy for this is a careful creamery man.

Another fault with butter is short weight. We are obliged by the net weight regulations of the National Pure Food Law to allow for "The ordinary and customary exposure of the packages to evaporation or to the absorption of water". But we occasionally find packages of butter on the market, particularly print butter, which are so short in weight that even the most generous allowance for evaporation will not account for the shrinkage. Some manufacturers endeavor to allow for shrinkage by declaring the net weight as "Sixteen ounces when packed". This form of declaring the net weight is not satisfactory because the Food and Drugs Act requires that the packages bear a statement of the quantity of contents at the time they are offered

for interstate shipment. Because of variations in weight which may occur before shipment, the statement of "Net weight when packed" is not necessarily a statement of the net weight when offered for shipment. Allowance should be made, when packing products which are liable to change in weight, so that the declaration of net weight will be true at the time the article is shipped or becomes subject to the operation of the law.

I believe that creamery men should exercise great care to see that their butter prints are in good order and not warped or shrunken so as to deliver less than full weight.

These are the points that I have wished to discuss with you—namely, declaring the quantity of contents on packages of maple products, low milk fat in butter, and short weight in butter. If there are any other matters in regard to the relation of the National Pure Food Law to your industries on which I can inform you, I shall be glad to do so.

A MEMBER:—Is there any standard for the weight of maple syrup?

MR. WALSH:—Yes. The standard is eleven pounds to the gallon.

SECRETARY:—If we supply our members with labels bearing a printed declaration of net contents, with the exact amount in blank to be filled in by the member with pen and ink, will this be satisfactory?

MR. WALSH:—Yes, providing the member actually fills in the blank and the statement is plain and conspicuous.

A MEMBER:—If cans bear the legend "One quart", "One gallon", etc., pressed in the tin, would that be a satisfactory declaration and would you assume that to represent the quantity of contents?

MR. WALSH:—I do not think this form of declaration is the best one. I think that the words "Net weight" or "Net measure" or "Net contents" should also appear but I believe that if the words "One quart", etc., appear alone that would justify us in assuming them to convey the meaning that the package actually contains a quart, etc.

A MEMBER:—We receive a great deal of sugar from farmers, packed in miscellaneous pails, and, in turn, we ship this sugar to manufacturers to be prepared for market. It is not practicable for us to determine the net contents of these pails, so we sell by bulk to the manufacturers, deducting a certain percentage agreed upon for the weight of the pails. Do we have to put the net weight on these pails?

MR. WALSH:—The Bureau of Chemistry has recently had this question up with a Vermont dealer and at present I believe the understanding is that sugar packed and sold as you state is not food in package form and need not bear a declaration of net weight.

A MEMBER:—Is there any chemical standard for maple sugar?

MR. WALSH:—The standard reads as follows: "Maple sugar is the solid product resulting from the evaporation of maple sap or maple syrup". You will note that no chemical limits are given in the standard. If you manufacture sugar from pure materials, you will have no trouble with the chemists, for we rely upon chemical analysis to determine adulterations of maple sugar and these analyses are based on data which has been secured by examining large numbers of samples of known maple sugars from different parts of the maple sugar territory.

Committee on Resolutions appointed by the Chair:—
J. L. Hills, J. B. Candon, E. A. Badger.

WEDNESDAY AFTERNOON SESSION.

REPORT OF COMMITTEE ON RESOLUTIONS.

Assembled in joint session, we the Dairymen and Sugarmakers of Vermont, express our appreciation of the efforts of speakers, exhibitors, the University, and of all who have contributed to the success of our gathering. Especially do we recognize the courtesy of the Burlington Light and Power Company in furnishing free light and power for use in the exhibitors' hall.

We believe that the Extension Service of the University of Vermont has done effective work during the past six years. We congratulate the last General Assembly and the State on the passage of the measure which has enabled county agents, home demonstration agents and boys' and girls' club leaders in 13 Vermont counties more adequately to serve their constituencies. We urge the Senate and House Committees on Agriculture in Congress to consider how important a thing it is in the interests of all classes of society that production be maintained at a profitable level, and how vital a factor in the solution of that problem is the educational work centering about the 48 Extension Services. We respectfully submit that the curtailment of extension funds would be not in the interests of true economy, but that, on the contrary, more would be lost than would be gained by the attempt to save a few dollars.

We deprecate the establishment by the Federal Department of Agriculture of the 82.5% fat standard in butter. We are at one with associations of buttermakers and creamery men in the Middle West and elsewhere in our belief that it is an inconsistent and impracticable figure. We urge the 80% standard commonly adopted in other countries.

We hereby instruct our secretary to forward to the Honorable Secretary of Agriculture and to Honorable G. N. Haugen, Chairman of the House Committee on Agriculture in Congress copies of these statements of our position touching extension work and the butter fat standard.

We are milk makers and sugar makers. We want to increase the use of our products. We believe in crying our wares. We commend the farsighted wisdom of those who planned the campaigns in our large cities and elsewhere, designed to set forth the food values of their products. We

rejoice in their success. We believe that the money **thus** spent is well invested and that bread thus cast upon **the** waters is sure to return again.

We are interested in the evidence of the spread of **the** cooperative spirit. Vermont farmers increasingly are **buy-**ing and selling in cooperation. There are those who would deny them this right. There are those who refuse to **quote** them their wares. There are entire industries which **are** said to have refused to quote, except at retail prices, **to** cooperative organizations. Time was when the embattled farmers stood at Concord and what they then did the whole world knows. Time may come, in 150 years or less from that April day in 1775, when they again may stand. We believe that manufacturers who take this antagonistic attitude are ill advised. Yet, while we believe in dealing in combination and in large units, we hold steadfastly to the principles of trading with our neighbors and townsmen whenever it is possible to do so without too great a monetary sacrifice.

We heartily approve and earnestly commend to the thoughtful consideration of our members the entire address of our retiring president and more especially his admonitions as to the wisdom of adequate bookkeeping on the farm and his remarks concerning the labor situation. We regret the misunderstanding of his position touching the farm usage of oleomargarine, evidenced by the reports in the morning's paper. His long and honorable record as an officer in this Association, and his lifetime close affiliation with Vermont's dairy interests are sufficient assurance of his orthodoxy in respect to oleomargarine.

We note with pleasure the stress our speakers lay upon the use of pure bred sires. God speed the day when the muffled drums' sad roll shall sound for the last scrub bull in Vermont. He is a bovine Bolshevik and should be deported.

We believe with our friend from Cornell University who spoke yesterday afternoon that it is better and cheaper to buy money of the men whose business it is to sell money than of the men whose business it is to sell feed or other farm supplies; and that it is better for the latter as well. We urge our members to think this over and to act accordingly.

We commend the stand taken by the National Grange, our State Grange and by many other representative farmers' associations touching the present attitude of organized labor. We see little in common today as between the farmer and union labor.

We are glad to note that farmers, more frequently than

in the past, are banding themselves together; that they are becoming less aloof, that they are bulking larger in the Nation's affairs. We welcome the formation of the National Federation of Farm Bureaus, believe in its purposes and are confident of its ability to accomplish them. We note with interest the announced intention of the President of the United States shortly to call to Washington a widely representative conference of farmers, analogous in its field to that heretofore called in the interests of industry. We trust that from such a conference much good may flow.

We recall the constructive work of the Roosevelt Country Life Commission of 15 years ago. We believe that it is high time that a similar survey was again made on a nationwide basis. We feel that the results of such a survey, clearly setting forth to the consuming public the agricultural situation of today, would go far towards allaying the unjustly antagonistic feeling often manifested against the farmer on the ground that he is a profiteer.

Since last we met two of our former associates have passed to their reward.

Myron A. Adams, of Newport, formerly president of the Dairymen's Association, long time its treasurer, Senator from Orleans County, farmer, creamery manager, a quiet, unobtrusive, kindly gentleman, died at his home last summer. For more than a score of years, he has been a constant attendant at our meetings. He did notable service 20 or more years ago in harmonizing an unhappy division in our ranks which for some time threatened to split the Association asunder. This episode has been forgotten by many of us; indeed, the younger generation hardly knows about it. It was a very real service that he rendered and the weld he then made has stood the test of time.

Mrs. Carrie J. Nelson Shackford, of Ryegate, was long a regular attendant at our meetings. Year after year her butter won sweepstakes or stood almost at the very top. It is quite certain that no other person has borne home as many prizes from the Vermont Dairymen's Association as did Mrs. Shackford. Left a widow with a considerable family of small children, she paid off a mortgage, reared and educated her boys and girls, made her hillside farm pay, bred a fine herd of Jerseys. Surely we can believe that ere this, of such a woman, there has been said the Biblical "Well done".

Respectfully submitted,

J. L. HILLS,
JOHN B. CANDON,
E. A. BADGER.

WEDNESDAY EVENING SESSION.

EXPERIMENTS.

C. F. PURINTON.

There seems to be little exact information as to the relation between quantity and quality in the production of maple sugar from syrup. There are fixed ideas as to cause and effect, but quatitative work along this line seems to be lacking.

The writer held in common with many sugar makers, the idea that large batches of syrup could not be converted into sugar without a very decided depreciation in both color and flavor. Close observation confirmed this opoinion. To verify these conclusions, it seemed to be desirable to perform a few experiments under more nearly laboratory conditions, therefore 2 pans were constructed with an area ratio of 3 to 1, that is, the heating area of one was 3 times the heating area of the other, but the volume of the 2 pans remained the same.

An equal amount of syrup was placed in each of these pans, and the contents were boiled to the consistency of maple sugar, taking considerable care to keep the rate of boiling as near uniform as possible. To accomplish this purpose, the pans were beaded, showing equal volume in each, and the gas flame over which it was boiled was carefully controlled, so that in each case, there was maintained an equal expansion due to the foaming of the contents.

The initial rate of boiling was continued until the temperature was raised to 230 degrees, when the rate of boiling was decreased, owing to the fear of scorching the contents, but the amount of decrease was carefully determined and kept equal in each case. Temperature readings were taken every 5 minutes during the course of the experimnt. The time consumed in reducing one pint of syrup to a temperature reading of 235 degrees in the pan of small area, was 70 minutes, an equal amount in the pan of large area and shallow depth took but 10 minutes. The sugar then grained and caked was so nearly identical in both color and flavor, that it was difficult to tell one from the other.

All preconceived ideas would have indicated that the syrup reduced in the pan of small area and great depth

would have produced a sugar much darker in color and of a decidedly inferior flavor.

The result of this experiment would seem to indicate that further investigation was desirable to determine why the larger batch of syrup in practice cannot be reduced to sugar without a deterioration in quality. The ratio of 3 to 1 as maintained in the experiment would seem to be sufficient to develop a variation in quality if this is due to the mere fact of deep boiling. The ratio of 7 to 1 in time consumed would seem to be a sufficient difference to develop a variation in quality if the time of boiling controls it in the least.

In view of the results of this experiment, it does not seem wise to draw conclusions, but leave the subject open for further experiment and discussion.

THURSDAY FORENOON SESSION.

MAPLE SUGAR SAND.

BY J. F. SNELL, MACDONALD COLLEGE, QUE.

Six years ago, Prof. W. H. Warren of Wheaton College, Norton, Massachusetts, addressed this Association on "The Nature of Sugar Sand, A By-Product of the Maple Sugar Industry and its Possible Commercial Value as a Cheap Source of Malic Acid and Derivative Products." A year and a half previously Prof. Warren had published what is, I believe, the first authentic chemical analysis of a properly washed sample of this material. When Prof. Warren's paper appeared in the Journal of the American Chemical Society in July, 1911, Mr. A. Grant Lockhead was engaged in the chemical laboratory of Macdonald College upon the analysis of a half dozen samples which he had collected in the spring of that year at my suggestion. In the preceding year I had myself analyzed the ash of two samples but had made no determination of the organic acid. Both Prof. Warren and Mr. Lockhead extracted the acid and identified it as malic acid, a conclusion which confirmed statements previously made by the Indiana Experiment Station, the Bureau of Chemistry of the U. S. Department of Agriculture and others, that the chief constituent of maple sugar sand was calcium malate. The highest percentage of calcium malate found in the seven samples analyzed by Prof. Warren and Mr. Lockhead is 80, the lowest, 66. The average amount is $70\frac{1}{2}$ per cent. The second most abundant constituent is silica, which in the seven samples in question varied from 6 to $18\frac{1}{2}$ per cent, averaging $12\frac{1}{4}$ per cent. There is an average of $13\frac{1}{4}$ per cent of undetermined matter, the minor constituents identified amounting to only 4 per cent instead of the $17\frac{1}{4}$ necessary to make up the total.

It must be borne in mind that these analyses were of samples thoroughly washed in the laboratory. As received from the producer sugar sand will often run materially lower in calcium malate than seventy or even sixty-six per cent. Amongst thirteen such samples which I analyzed in 1914 were one with 84 per cent, eleven with 52 to 71 per cent and one with only 39 per cent of calcium malate. In the

same year I analyzed a sample which had been standing in a garret for some time and found only 3 per cent of calcium malate. I believe that sugar sand left in a moist condition will deteriorate rapidly in its calcium malate content but I have not yet made any experiments to confirm this opinion.

THE MALATES OF CALCIUM.

As I shall have frequent occasion to speak of the two calcium salts of malic acid, it may conduce to clearness if I now explain the relationships between these salts and the acid and describe their respective properties. Malic acid is what we call a dibasic acid. In forming salts from it we may have either one or two of the hydrogen atoms of its molecule replaced by a metal. If only one is replaced we have what we call an acid salt. If both are replaced we have the normal or neutral salt. In the case of calcium, accordingly, we may have either the acid salt, which we call *calcium bimalate*, or the normal salt, which we call *calcium malate*. It is the latter which is present in maple sugar sand.

At ordinary temperature 100 parts of water will dissolve less than one part of calcium malate. In hot water it is a little less soluble than in cold water. Calcium bimalate, though only a little more soluble in cold water than the normal salt, is very much more soluble in hot water. According to the German chemists, Iwig and Hecht, who determined its solubility in 1886, 100 parts of water at 57°C. (135°F.) dissolve 32 parts of anhydrous calcium bimalate, which would correspond to over 43 parts of the crystallized bimalate, inasmuch as the crystals contain about 26 per cent of water. This great variation in the solubility of calcium bimalate in hot and cold water renders it easy to purify this substance by recrystallization. We have simply to dissolve the salt in a small quantity of hot water, cool the solution and filter off the crystals which separate. Impurities remain in the mother liquor drained off from the crystals. Calcium bimalate has an acid taste, resembling that of cream of tartar, but rather sharper than the latter on account of its greater solubility. Like cream of tartar it reacts with moist baking soda liberating carbon dioxide. As suggested by Prof. Warren it would probably make an excellent acid constituent for baking powder, but it can certainly not be made from sugar sand cheaply enough to compete with cream of tartar, much less with alum and acid phosphate of lime, materials which have largely displaced cream of tartar as acid ingredients for baking powders.

WEIGHT RELATIONS AND LABORATORY YIELDS.

To show the relationships of weight between malic acid, its two calcium salts, laboratory-washed sugar sand, and ordinary sugar sand I have made out a table in which each of the five in turn is taken as the basis of percentage. In its last line, for instance, this table shows that 100 pounds of average Quebec sugar sand as marketed by the producer, containing as it does 61 lbs. of calcium malate, would yield 73.5 lbs. of calcium bimalate or 48 lbs. of malic acid if it could be converted into these products without loss. Some loss, however, is inevitable. In my experiments it has amounted to about 25 per cent. In other words, instead of 100 lbs. of sugar sand yielding nearly 75 lbs. of bimalate crystals, it has not given more than about 50 to 55 lbs. of these crystals, corresponding to about 36 lbs. of malic acid instead of 48. I think it quite possible that better yields can be realized. Indeed, Prof. Warren in one instance actually got out as bimalate ninety-six per cent of the malic acid found by analysis.

ESTIMATES OF THE ANNUAL PRODUCTION.

In his 1913 address to this Association Prof. Warren attempted an estimate of the annual output of sugar sand, basing it upon:—

1. The production of syrup and sugar in the states of Vermont, New York, Ohio and Pennsylvania and the Provinces of Quebec and Ontario.

2. Sy's statement¹ that the average yield of a maple tree is about 3 pounds of sugar a year.

3. An average annual yield of 20 pounds of sugar sand per 1,000 trees,—an estimate that appears to be based upon three or four years' observations of a single bush of 1,000 trees whose annual yield varied from 16 to 30 lbs.

Whether Prof. Warren hit upon a close approximation to the correct average production per thousand trees when he set it at twenty pounds, I do not know. In 1912 I attempted to get some information upon this point by sending Mr. Lockhead to weight and sample the sand produced by some twenty-one farmers in the Province of Quebec, but unfortunately the records of his weighings have been lost. He burned the samples in the laboratory and I made some estimates from the weights of the ashes which would indi-

¹Sy, History, Manufacture and Analysis of Maple Products, Journal of the Franklin Institute, Oct., Nov., and Dec., 1908.

cate that $6\frac{1}{4}$ pounds of washed sugar sand—equivalent to about 7 1-5 pounds of ordinary dry sugar sand—was about the average yield of one thousand trees. This may be low. I hope it is. I should appreciate any help you can offer me towards getting a reliable general estimate of the average yield of sugar sand per thousand trees and the average yield per thousand pounds of sugar. Some sugar makers must have information on this point. Many could get it with but little trouble.

Prof. Warren's estimate of the number of trees tapped is certainly a conservative one. The four states he takes in produce only about four-fifths of the sugar and syrup of the United States and the 1910 census sets the Canadian production considerably higher than the figures used by him. According to the 1909 United States census and the 1910 Canadian census, the total annual production of maple sugar in the two countries would be about 71 million pounds. If we take the average annual production of a tree as two pounds, this would correspond to 35 million trees. The United States census actually gives the number of trees tapped in this country as nearly 19 million,—which is more than Prof. Warren counted upon for both countries.

According as we use Prof. Warren's figure of twenty pounds of sand per 1,000 trees or mine of seven pounds, we arrive at results of 100 to 330 tons ordinary sugar sand or of 50 to 160 tons of malic acid as the annual production of the sugar maples in America.

COLLECTING.

How much of this could be collected for manufacturing purposes? That would depend largely upon the price offered. The small producer gets so little sugar sand that it would scarcely be worth while for him to save it unless the price offered were very high. On the other hand, the man who has a large bush and makes a specialty of syrup must have a considerable quantity, which it would be profitable to wash and dry even if it commanded a lower price per pound than maple sugar. When the demand for malic acid becomes too large for the syrup makers to supply, it will be necessary for sugar sand buyers to offer a price sufficiently in advance of that of maple sugar to induce farmers to take the trouble to separate the sand and to wash and dry it. At present the demand is so small that it is easily supplied by the larger makers of syrup. But, even under these conditions, sugar sand of good quality has commanded fully as high a price as good maple sugar. The

market has been so small and so uncertain that only a few have thought it worth while to wash and dry their product.

As soon as there is a settled outlet for the sand no doubt buyers of syrup and sugar will take steps to induce more farmers to save it. Such buyers are in good position to collect the material and to serve as middlemen between the producers and the chemical manufacturer.

COMPETING SOURCES OF MALIC ACID.

Malic acid occurs in many fruits. It takes its name from the apple (Latin *malum*), in which fruit it was discovered by the great Swedish chemist, Scheele, in 1785. A few years ago the United States Department of Agriculture carried out some experiments in the Hood River Valley, Oregon, on the manufacture of a table syrup and a concentrated cider from waste apples. An official of the Department was good enough to send me samples of the syrup and of the calcium malate obtained as a by-product. The syrup resembled that which is formed in baking apples, having a flavor which was pleasant, but not sufficiently attractive to enable it to compete favorably with maple syrup or even with cane or corn syrups. I was informed by the Bureau of Chemistry in 1916 that one firm had started the manufacture of concentrated cider, but I have not heard of their marketing calcium malate.

Gooseberries, currants and cherries are said to contain malic acid but these are obviously not probable sources of manufacture. Rhubarb, tobacco waste and some wild fruits, such as sumac and mountain ash berries, are, however, cheap enough to come into consideration. Indeed, from what appears in the literature it would seem that the chief source of the acid in Europe in the past has been a species of mountain ash. In none of these materials, however, do we find a salt of malic acid so nearly pure as the calcium salt in sugar sand. The task of separating the acid from the other substances present is much more difficult in these materials than in sugar sand.

So many marvellous things have been accomplished in synthetic chemistry of late years that it is not impossible that malic acid may be produced from some cheap material of a quite different nature, and that just as synthetic indigo has largely displaced the natural plant product, artificial malic acid may be produced more economically than the natural acid can be separated from the impurities which

occur in it. Up to the present, however, maple sugar sand appears to be the most economical source of the acid.

PREPARATION FOR MARKET.

To prepare maple sugar sand for market it is necessary to wash the sugar out of it and then to dry it promptly and thoroughly. It can be washed in the felt or flannel filter used to strain the syrup. Hot sap may be used for the first or first two washings but hot water should be used subsequently so as to remove all sugar. The first wash waters can be evaporated to syrup. One of our Canadian makers tells me he makes five or six gallons of syrup from the washings of his sugar sand. It is better to wash several times with small quantities of hot water rather than a smaller number of times with large quantities of water. Each lot of water should be allowed to drain out well before the next is added. When the wash water draining through the filter no longer tastes sweet, the sand should be spread out in a thin layer on cotton or paper in a warm room until dry. It may then be put into bags, kegs or boxes and kept in a dry place. It must be kept dry until it reaches the factory.

PROSPECTS.

Maple sugar sand was shipped from Canada to a German manufacturer of fine chemicals just before the outbreak of the war. This outlet being closed, I tried to interest chemists in the Alliance and in the United States in maple sugar sand, but without success except in the instance of one French firm. A quantity of sand was sent to France but I have had no report as to whether experiments were made with it or not. Within the last few months, several American manufacturers have written me regarding maple sugar sand and the uses referred to in Dr. Acree's paper appear to offer a prospect of a market for a few tons of material in the coming season.

Those of our Canadian producers and buyers of maple products who have saved or bought maple sugar sand in the past have not failed to find a market for it sooner or later and the prospects are certainly much brighter now than they have ever been in the past.

TABLE I.

CORRESPONDING QUANTITIES OF MALIC ACID,
CALCIUM MALATES AND MAPLE SUGAR SAND.

Malic Acid. H ₂ C ₄ H ₄ O ₅ .	Calcium Malate CaC ₄ H ₄ O ₅ .	Calcium Bimalate $\frac{1}{2}$ Ca(HC ₄ H ₄ O ₅) 2.6H ₂ O.	Sugar Sand. Laboratory Washed.	Ordinary.
100	128	154.5	183	210
78	100	120	143	164
65	83	100	118	136
55	70	84	100	115
48	61	73.5	87	100

BUSINESS MEETING.

At the Annual Business Meeting of the Association Victor I. Spear presided in the absence of President Chapin. Secretary Ormsbee read his report as did also Treasurer Purinton, both of which were accepted and adopted.

Following a lengthy discussion of the importance and possibility of holding secondary or subsidiary meetings, Mrs. Dodd made a motion that an executive committee of three, in addition to the regular officers, be appointed to carry out such an arrangement. Mr. Purinton moved that the chair appoint a nominating committee of three to report a list of officers, at the meeting at 3:00 o'clock at Morrill Hall. The chair appointed E. A. Badger, Mrs. Dodd and P. B. B. Northrop.

At 3.00 o'clock in the afternoon at a meeting held in Morrill Hall the following business was transacted and officers elected.

President.....C. A. Badger, East Montpelier
 Secretary.....M. J. Corliss, Berlin
 Treasurer.....L. L. Story, East Fairfield
 Auditor.....P. B. B. Northrop, Sheldon

THE MAPLE TREE.

GEO. P. BURNS.

Britton in his book on North American trees gives twenty-one kinds of native maple growing in the United States. Of these only seven are found in Vermont. In addition the Norway maple is planted abundantly in villages as a street and yard tree. Numerous horticultural varieties of the silver maple have been introduced into landscape work on account of the drooping habit of the branches and fine divisions of their leaves—the cut leaved maples.

Of the seven maples native to the state, two, the mountain maple and the striped maple or moosewood are shrubby.

The maples are distinguished easily from all other trees by the peculiar winged or "Key" fruit. The leaves in all except the ash-leaved maple are so similar as to form a good family character.

The most beautiful and most useful of all our maples are the sugar maple and the closely allied form the black maple. These two trees are the best street and best lawn trees, the wood is of highest quality and they yield our maple sap.

The wood is so composed of elements which serve as conducting tubes for the sap, mechanical fibres and storage cells. The first are easily seen with the naked eye as small holes in the end of a board. The storage cells are located near the conducting cells and often occur in great numbers and appear as gray patches $\frac{1}{4}$ of an inch in length in the cross section of a tree. They are almost completely filled with starch. In addition, starch is stored in many of the mechanical cells especially those formed in the late summer, the last cells made by the tree during the year. As an examination of the end of a stump shows numerous fine lines radiating from the center to circumference. These are the pith rays and they too are filled with starch. The wood then consists of thousands of little boxes which may be arranged into three groupings—mechanical, storage and conducting tissues. Each plays its own important part in the life of the tree. When we tap a tree, we bore into this complex system of tissues and rob the tree of some of its stored food—maple sugar.

HONORS AWARDED.

CLASS A.

LARGEST AND BEST DISPLAY OF MAPLE PRODUCTS.

Helen S. Dodd, S. Newbury, Vt.

CLASS B.

MOST ARTISTIC DISPLAY OF MAPLE PRODUCTS.

Helen S. Dodd, S. Newbury, Vt.

CLASS C.

BEST MAPLE SUGAR CAKES, NOT LESS THAN FIVE POUNDS.

D. E. Giddings, East Fairfield, Vt.

CLASS D.

BEST EXHIBIT OF MAPLE CREAM, NOT LESS THAN FIVE PACKAGES.

M. G. Lamson, East Montpelier, Vt.

CLASS E.

MAPLE SYRUP SINGLE GALLONS IN GLASS OR TIN.

	Score
George Ladeau, Fairfield, Vt.	98
E. G. Wetherby, Danby, Vt.	100
F. F. Spear, W. Newbury, Vt.	99.5
J. P. Spear, W. Newbury, Vt.	99.5
Edward Graveline, Newport, Vt.	98.5
M. G. Lamson, E. Montpelier, Vt.	100
Jennie Badger, E. Montpelier, Vt.	96
Guy Prindle, St. Albans	99.5
Martin Prindle, St. Albans	99.5
Guy Magoon, Newport, Vt.	100
A. F. Curtis, St. Albans, Vt.	98
W. F. Field, Hardwick, Vt.	99
Curt Bromley, Danby, Vt.	98

J. Armida Marcette, E. Fairfield, Vt.....	98
Jora Marcette, E. Fairfield, Vt.....	98
Corbitte Bros., W. Brattleboro, Vt.	97.5
E. C. Corbitte, W. Brattleboro, Vt.	97.5
Mrs. Martin Bromley, Danby, Vt.	99.5
Martin Bromley, Danby, Vt.	99.5

CLASS F.

MAPLE SUGAR IN TEN POUND PAILS OR TUB.

	Score
Martin Prindle, St. Albans, Vt.	99

HONORARY MEMBERS VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

Page, Hon. Carroll S.,	Washington, D. C.
Dillingham, Hon. William P.,	Washington, D. C.
Greene, Hon. Frank L.,	Washington, D. C.
Dale, Hon. Porter H.,	Washington, D. C.
	Minahan, Dr. R. E.,
	Green Bay, Wis.
	Sevey, C. G., Editor New England
	Homestead.....Springfield, Mass.
	Vail, Hon. Homer W.,
	Randolph, Vt.

MEMBERS VERMONT MAPLE SUGAR MAKERS' ASSOCIATION.

A		Barnett, R. E.,	South Ryegate, Vt.
Abbott, Sam Lee.....	Bethel, Vt.	Barrett, C. H.....	Thetford, Vt.
Abbott, Walter I.....	Marshfield, Vt.	Barrett, M. L.....	Cabot, Vt.
Abell, H. L.....	Enosburg Falls, Vt.	Barston, Clinton.....	Norwich, Vt.
Adams, Herbert W.,	White River Junction, Vt.	Bartholomew, A. V.,	White River Junction, Vt.
Adams, L. H.....	Wilmington, Vt.	Bashaw, H. A.,	R. F. D., Orleans, Vt.
Akin, J. R.....	Newport, Vt.	Bean, F. H.....	West Glover, Vt.
Aldrich, C. F.,	R. F. D., Springfield, Vt.	Beckwith, W. H.....	Chelsea, Vt.
Aldrich, A. W.....	Springfield, Vt.	Before, Henry.....	Newport, Vt.
Allbee, G. H.....	East Hardwick, Vt.	Benedict, G. H.....	Underhill, Vt.
Allen, A. F.....	So. Londonderry, Vt.	Bennett, Alice M....	Brattleboro, Vt.
Allen, C. H.....	South Royalton, Vt.	Benton, John.....	Lincoln, Vt.
Allen, Fred E....	South Royalton, Vt.	Best, A. M.,	
Allen, W. D....	West Charleston, Vt.	Bigelow, F. M....	Essex Center, Vt.
American Felt Co.,	100 Summer St., Boston, Mass.	100 William St., New York City	
Amidon, O. W.....	Grove, Vt.	Bigelow, James T.,	Saxtons River, Vt.
Amsden, Randall A.,	Simondsville, Vt.	Billings, B. A. & Son,	Rochester, Vt.
Andrews, Mary L.	Dorset, Vt.	Bingham, Lucien W.,	Middlebury, Vt.
Ashline, F. R.,	R. D. 1, Worcester, Vt.	Bisbee, John C.....	Moretown, Vt.
Atkins, C. H.....	Westmore, Vt.	Blanchard, D. L.....	Cavendish, Vt.
B		Blanchard, F. W.,	Ascutneyville, Vt.
Bacon, Richard.....	Chelsea, Vt.	Blanchard, O. C.....	Cavendish, Vt.
Badger, C. A....	East Montpelier, Vt.	Blandin, W. C.....	Barnet, Vt.
Badger, Mrs. J. E.,	East Montpelier, Vt.	Bolster, Orrin E....	East Dover, Vt.
	Boynton, S. B.....	Borland, C. M.....	West Glover, Vt.
	Rutland, Vt.	Bradley, R. J.....	Moretown, Vt.
Badlam, G. E. L.....	Williamstown, Vt.	Brigham, E. S.....	St. Albans, Vt.
Bailey, L. J.....	South Ryegate, Vt.	Brigham, Fred L.....	Norwich, Vt.
Baldwin, J. C.....	Mt. Holly, Vt.	Brimblecombe, R. C.....	Cabot, Vt.
Baldwin, R. G.....	Mt. Holly, Vt.	Brock, John B....	West Newbury, Vt.
Barber, Hoyt H.....	Brattleboro, Vt.	Bromley, Delos B.....	Danby, Vt.
Barber, C. H.....	Burlington, Vt.	Bromley, Duane P.....	Danby, Vt.
Barnard, E. Wellman,	Springfield, Vt.	Bromley, Mrs. K. M.....	Danby, Vt.
		Bromley, Mrs. M. J.....	Danby, Vt.

Bromley, M. J.....	Danby, Vt.	Coburn, Harry L.,	
Bromley, Mott H.....	Danby, Vt.		East Montpelier, Vt.
Bromley, Miss Nancy F.,		Colby & Strawn,	
	Danby, Vt.		R. F. D., Orleans, Vt.
Bromley, R. N.....	Danby, Vt.	Cole, W. W.....	Enosburg Falls, Vt.
Bronson, Mrs. Jennie A.,		Collins, E. B.....	Hyde Park, Vt.
	East Hardwick, Vt.	Collins, C. W.....	Strafford, Vt.
Brown, B. B.....	Danby, Vt.	Collins, M. L.....	Strafford, Vt.
Brown, W. John,		Collins, W. H.....	Strafford, Vt.
	Middletown Springs, Vt.	Colvin, C. H.....	Danby, Vt.
Bruce, Frank.....	Warren, Vt.	Colvin, Mrs. C. H.....	Danby, Vt.
Brunelle, Zephire.....	Chelsea, Vt.	Colvin, N. E.....	Danby, Vt.
Buck, Myron J.....	East Bethel, Vt.	Colvin, Nellie.....	Danby, Vt.
Bugbee, E. J.....	Tunbridge, Vt.	Colvin, John C....	West Rutland, Vt.
Burbank, M.	Orleans, Vt.	Cook, A. H....	Middletown Spgs., Vt.
Burnett, R. E.....	Bethel, Vt.	Cook, L. E.....	Cambridge, Vt.
Burnham, T. K.,		Coolidge, A. W....	Bellows Falls, Vt.
	R. F. D. 1, Bristol, Vt.	Coolidge & Sessions,	
Burton, E. S.....	Mt. Holly, Vt.		Bellows Falls, Vt.
Butler, A. E.....	Moretown, Vt.	Coolidge, O. J.,	
			South Londonderry, Vt.
C		Corbett, E. B.,	
			West Brattleboro, Vt.
Cady, H. H.....	Jericho, Vt.	Corbett Brothers,	
Cameron, Wm. W.,			West Brattleboro, Vt.
	West Glover, Vt.	Corbett, V. S.,	
Carleton, A. A....	West Newbury, Vt.		West Brattleboro, Vt.
Carleton, A. H....	West Newbury, Vt.	Corry, Dewey.....	Danby, Vt.
Carlton, E.,		Coville, Albert F.....	Andover, Vt.
	21 Highland Ave., Barre, Vt.	Cram, M. F.....	Bridgewater, Vt.
Carlton, S. W. & Son....	Chester, Vt.	Crawford, B. R.....	Montpelier, Vt.
Carpenter, C. H. & Son,		Croft, A. J.....	Enosburg Falls, Vt.
	Enosburg Falls, Vt.		Sec. Franklin County Pure
Carver, Chester E.,			Maple Sugar and Pure
	Simondsville, Vt.		Maple Syrup Co.
Carey, Geo. C.....	St. Johnsbury, Vt.	Curtis, A. T.	St. Albans, Vt.
Chaffee, C. E.....	Irasburg, Vt.	Cutting, Frank A.,	
Chamberlin, H. B.....	Irasburg, Vt.		79 Summer St., Boston, Mass
Chamberlin, W. C.,		D	
	South Ryegate, Vt.		
Chandler, W. G. & Son,			
	West Danville, Vt.	Daniels, B. W.....	Middlesex, Vt.
Chapin, H. B.....	Middlesex, Vt.	Daniels, Sam.....	Hardwick, Vt.
Chapin, J. A.....	Middlesex, Vt.	Davis, G. A.....	Rutland, Vt.
Chapin, M. E.....	Middlesex, Vt.	Davis, John P.....	Chelsea, Vt.
Chase, Perry.....	East Fairfield, Vt.	Davis, Smith G....	Montgomery, Vt.
Cheney, S. T. R.....	Jamaica, Vt.	Day, Edmund.....	Newport, Vt.
Church, F. A.....	Bellows Falls, Vt.	Day, L. S.....	Irasburg, Vt.
Church, W. E.,...		Divoll, F. P.....	Springfield, Vt.
	R. F. D. 1, Derby, Vt.	Dobias, John.....	Colrain, Mass.
Clark, C. C.....	R. F. D. 3, Bristol, Vt.	Dodd, Helen.....	East Corinth, Vt.
Clark, E. L.....	Glover, Vt.	Dodd, Walter Sedgwick,	
Clark, Mrs. J. A....	Brattleboro, Vt.		East Corinth, Vt.
Clark, Roy G.....	Belmont, Vt.	Drinkwater, Forrest..	Plainfield, Vt.
Clifford, A. E.,		Dow, Ora.....	Cabot, Vt.
	R. F. D. 2, Starksboro, Vt.	Dow, Horace N....	Middlebury, Vt.
Cloud, J. H.....	Pompanoosuc, Vt.	Dumont, Henry.....	Chelsea, Vt.
Cobb, Chas. R.....	Woodstock, Vt.	Dunnett, G. H....	South Ryegate, Vt.
Cobb, Geo. C.....	Rutland, Vt.	Durant, J. H....	West Newbury, Vt.

Dutton, E. E. R. F. D., Orleans, Vt. Gould, J. Danby, Vt.
 Dutton, Geo. L. South Royalton, Vt. Graveline, Edward. Newport, Vt.
 Dutton, R. A. Orleans, Vt. Greene, M. T. Pawlet, Vt.
 Dwinell, Earle G. Plainfield, Vt. Gregg, Leon A.,

E

Eastman, A. L. Groton, Vt. Grimm, G. H., Est. Rutland, Vt.
 Eaton, C. H. Rochester, Vt. Grimm, John H. Montreal, Can.
 Egan, John P. Middlesex, Vt. Grimm, Nellie M. Rutland, Vt.
 Ellsworth & Sons, Jeffersonville, Vt. Gross, E. A., R. F. D. Orleans, Vt.
 Emery, Herbert E. Plainfield, Vt. Grout, H. L. Perkinsville, Vt.
 Emery, Nellie E. Plainfield, Vt. Grout, Leon E. East Jamaica, Vt.
 English, L. W. Woodstock, Vt. Guyette, H. A.,
 Erwin, W. S. East Corinth, Vt. North Montpelier, Vt.

F

Farmer, F. A. East Burke, Vt. Haile, C. H. Montgomery, Vt.
 Field, W. F. Hardwick, Vt. Hall, A. R. Derby, Vt.
 Fields, H. B. & Son. Milton, Vt. Hammond, W. S. Newport, Vt.
 Findlay, Howard, Harrington, F. E. Wingham, Vt.
 North Craftsbury, Vt. Hart, Robert C.,
 Fish, Marshall B. Rutland, Vt. 159 Nicholas Ave., Brooklyn, N. Y.
 Fisher, Hosea, Haskell, N. M. & Son,
 West Brattleboro, Vt. Wilmington, Vt.
 Fitch, E. C. East Calais, Vt. Hatch, S. A. West Danville, Vt.
 Fitzgerald Bros. Underhill, Vt. Hathorn, G. B. Barnard, Vt.
 Follett, O. W. Townshend, Vt. Hazzard, G. M. Charlotte, Vt.
 Forbes, Chas. Andover, Vt. Hayes, Mrs. A. L. Strafford, Vt.
 Foster, C. D. Cabot, Vt. Hayes, F. W. Strafford, Vt.
 Foster, E. M. Waterbury, Vt. Hayes, J. Strafford, Vt.
 Foster, Col. H. S. North Calais, Vt. Hayes, J. R. Strafford, Vt.
 Fuller, A. A., Hayes, M. W. Strafford, Vt.
 R. F. D. 1, Warren, Vt. Hayes, R. W. South Strafford, Vt.
 Fuller, F. S. & Co., Hayford, W. E.,
 Saxtons River, Vt. East Montpelier, Vt.
 Fulton, George B. Irasburg, Vt. Haynes, C. C. Wilmington, Vt.
 Heald, E. I. & Son,
 Proctorsville, Vt.

G

Gardner, Geo. C. Springfield, Vt. Heald, Percy E.,
 Gaylord, P. B. Waitsfield, Vt. Chester Depot, Vt.
 George, F. A. Williamstown, Vt. Hendricks, A. S. Franklin, Vt.
 Giddings, D. E. East Fairfield, Vt. Hewes, K. F. So. Londonderry, Vt.
 Gilbert, W. B. Woodstock, Vt. Hewes, L. K. & Son,
 South Londonderry, Vt.
 Gilbert, H. H. & Son, Hewins, Henry W.,
 East Fairfield, Vt. Thetford Ctr., Vt.
 Gile, Geo. B. Jericho, Vt. Hewitt, A. W. Plainfield, Vt.
 Gillman, Dean N. Chelsea, Vt. Hewitt, Harvey J. Bristol, Vt.
 Goddard, M. F. Waterloo, Can. Higgins, Dr. J. H.,
 Union Village, Vt.
 Going, G. A. Orleans, Vt. Hill, Arthur S.,
 R. F. D., Bristol, Vt.
 Goldthwaite, A. P., Hill & Clifford. Starksboro, Vt.
 Shelburne, Mass. Hill, E. K. Middlesex, Vt.
 Hills, Dean Joseph L.,
 Burlington, Vt.
 Goodrich, Chas. T. Benson, Vt. Hines Bros. Hardwick, Vt.
 Gordon & Elliott, ... Pelchville, Vt. Hogan, A. G. R. D., Bristol, Vt.
 Gould, Mrs. J. Danby, Vt.

Holbrook, P. H....West Burke, Vt.
Holden, Ira L.....Northfield, Vt.
Holden, W. W.....Northfield, Vt.
Holden, Arthur M.,
North Clarendon, Vt.
Holden, John C.,
North Clarendon, Vt.
Holden, Jerome Putney, Vt.
Hooper, E. J.....East Fairfield, Vt.
Hopkinson, George Derby, Vt.
Horton, G. B.....Ludlow, Vt.
Hoskison, H. M.....Mt. Holly, Vt.
Howard, Dana I.,
West Brattleboro, Vt.
Howard, E. T.....West Hartford, Vt.
Howe, Elmer Tunbridge, Vt.
Howe, Will W.....Tunbridge, Vt.
Hoxie, Benjamin J.,
Proctorsville, Vt.
Hoxie, Will W.....Tunbridge, Vt.
Hubbell, M. L.....Enosburg Falls, Vt.
Hunt, A. J.....Westfield, Vt.
Huntoon, Philip J.....Charleston, Vt.
Hutchins, Walter D.,
No. Woodstock, N. H.

J

Jackson, O. H.....Westford, Vt.
Jenne, A. M.,
R. F. D., Richford, Vt.
Jennison, William Pawlet, Vt.
Jewell, Frank G.....Corinth, Vt.
Johnson, I. P. Craftsbury, Vt.
Johnson, Jason Plainfield, Vt.
Jones, C. H.....Burlington, Vt.
Jones, G. M.....Waitsfield, Vt.
Jones, E. H.....Waitsfield, Vt.
Jones, N. M.....Richford, Vt.
Jones, W. A.....Randolph, Vt.
Joslin, E. J.....Newport, Vt.

K

Kelley, C. B.....Derby, Vt.
Kelley, E. S.,
R. F. D. 3, Orleans, Vt.
Kingsley, O. A.....East Fairfield, Vt.
Kitching, Robert R....Orleans, Vt.
Knapp, E. E.....Townshend, Vt.
Kneeland, Doric A.....Waitsfield, Vt.

L

Lackey, E. A. Jamaica, Vt.
Lackey, J. E. & J. A....Derby, Vt.
Ladd, N. P.....Richford, Vt.
Ladeau, George Fairfield, Vt.
Laird, G. A. Cabot, Vt.
Lane, C. H.....Middlebury, Vt.

Lathrop, E. W.....Vernshire, Vt.
Lawrence, E. D.....East Fairfield, Vt.
Leader Evaporator Co., The
Burlington, Vt.
Learned, Z. A.....West Halifax, Vt.
Leonard, T. A.....Proctorsville, Vt.
Lewis, R. C.....Woodstock, Vt.
Lewis, R. M.....Woodstock, Vt.
Lilley, J. O.....Plainfield, Vt.
Libby, F. J.....Newport, Vt.
Lilley, Carl D. F.....Plainfield, Vt.
Lomberg, F. W.....Arlington, Vt.
Ludenn, Mrs. George,
R. D. 4, St. Albans, Vt.
Luxford, Leo L.....Newport Ctr., Vt.
Lyman, Dewey Hartland, Vt.
Lyman, J. A.....Hartland, Vt.
Lyndon Home Project Club,
Lyndon, Vt.

M

Mack, Wm. H....Ascutneyville, Vt.
Mackay, Donald,
Mgr., Grove Hill Farm,
Thetford Ctr. Vt.
Magoon, A. R. & Son..Newport, Vt.
Maloney, Patsey,
East Wallingford, Vt.
Marcette, Mrs. E. H.,
East Fairfield, Vt.
Marcette, Eli H.,
East Fairfield, Vt.
Marcette, Zora A.,
East Fairfield, Vt.
Marden, C. S.....Londonderry, Vt.
Marony, R. H.....Rutland, Vt.
Marsden, Geo. L....Northfield, Vt.
Marcette, Miss Hazel,
East Fairfield, Vt.
Marcette, J. Armida,
East Fairfield, Vt.
Marcette, Joseph,
East Fairfield, Vt.
Marsh, Geo. F.,
Chester Depot, Vt.
Marshall, H. C.....Belmont, Vt.
Martin, Arthur T....Rochester, Vt.
Martin, C. E.....Rochester, Vt.
Martin, E. J. Montgomery, Vt.
Martin, Orlando L....Plainfield, Vt.
Martin, R. J.....Rochester, Vt.
Martin, Wm. E.....Norwich, Vt.
Martin, W. S.....Plainfield, Vt.
Martin, Wm. S. & Sons,
Rochester, Vt.
Mather, G. E.....Readsboro, Vt.
Matthews, Andrew C.,
21 Watkins St., Rutland, Vt.

Maxfield, E. C.	Newport, Vt.	P	
Maxham, M. C.	Worcester, Vt.		
May, Fred	Wilmington, Vt.	Page, Hon. Carroll S.,	
May, Fred H.	Thetford Ctr., Vt.		Hyde Park, Vt.
May, J. H.	Burlington, Vt.	Page, R. G.	East Corinth, Vt.
McKnight, Geo. C.,		Page, W. B.,	
	East Montpelier, Vt.		R. F. D. 3, Springfield, Vt.
Merrifield, A. M.	Williamsville, Vt.	Palmer, Leon E.	Westfield, Vt.
Merrifield, S. A.	Williamsville, Vt.	Park, O. H.,	
Merrill, John H.	Roxbury, Vt.		R. F. D. 1, West Burke, Vt.
Metcalf, H. J.	Underhill, Vt.	Parker, C. A.	Irasburg, Vt.
Miles, McMahon & Son.	Stowe, Vt.	Parker, Fred F.,	
Miller, H. D.	Westfield, Vt.		East Wallingford, Vt.
Miller, R. I.	West Brattleboro, Vt.	Patch, C. D. & Son.	Hartland, Vt.
Miner, John F.	South Royalton, Vt.	Patterson, F. L.	Newport, Vt.
Mitchell, E. M.	Derby, Vt.	Pearl, Edwin S.	Vershire, Vt.
Morey, B. S.	Waterbury Ctr., Vt.	Peace, C. H.	Marlboro, Vt.
Morrison, John G.,		Pease, Edward E.	Weston, Vt.
	Cambridge, Mass.	Peavy, I. L.	Morgan, Vt.
Morse, Ira E.	Cambridge, Vt.	Peck, Company. St. Johnsbury, Vt.	
Morse, L. B.	Norwich, Vt.	Peck, O. E. & L. E.,	
Moulton, F. R.	Derby Line, Vt.		Westminster, Vt.
Moulton, P. B.	Weston, Vt.	Perley, Eugene	Richford, Vt.
Muller, H. A. E.	Brattleboro, Vt.	Perley, Eugene & Son,	
Munderloh, Henry,			Richford, Vt.
	North Derby, Vt.	Perry, Clarence E.	Coventry, Vt.
Murray, John S.,		Perry, C. D.	Springfield, Vt.
	South Cavendish, Vt.	Perry, E. B. & Son.	Ira, Vt.
Myott, John.	Montgomery, Vt.	Phillips, R. D.	Townshend, Vt.
		Pike, Mrs. J. B.	Marshfield, Vt.
		Pike, J. B.	Marshfield, Vt.
		Pike, S. C.	Montpelier, Vt.
		Pitt, Telesphore	Newport, Vt.
		Pitkin, E. W.	Plainfield, Vt.
		Plastridge, Wallace A.,	
			Northfield, Vt.
Naramore, H. D.	Orwell, Vt.	Plumley, Elmer ..	Cuttingsville, Vt.
Neill, B. E.	Warren, Vt.	Powell, G. D.	Mt. Holly, Vt.
Nelson, Geo. A.	East Barnet, Vt.	Pratt, F. S.	Montgomery, Vt.
Nelson, G. E.	Barre, Vt.	Pratt, H. L.	Cuttingsville, Vt.
Newell, Bernard W.,		Priest, S. J.	Belmont, Vt.
	West Wardsboro, Vt.	Prindle, Guy M.	St. Albans, Vt.
Newell, Mrs. E. O.,		Prindle, Martin	St. Albans, Vt.
	West Wardsboro, Vt.	Prouty, H. C.	Green River, Vt.
Newell, E. O.	West Wardsboro, Vt.	Purinton, C. F.	Burlington, Vt.
Nicholls, G. L.	Enosburg Falls, Vt.	Putnam, Fred A.,	
Niles, Allen P.	Derby, Vt.		R. F. D. 3, Springfield, Vt.
Northrop, Frank	Ludlow, Vt.	Putnam, Leon R.,	
Northrop, P. B. B.	Sheldon, Vt.		R. F. D. 3, Springfield, Vt.
Nye, George W.	St. Albans, Vt.	Perry, Dolphus.	East Fairfield, Vt.
		R	
Ormsbee, C. O.	Montpelier, Vt.	Ransom, H. E. & Sons,	
Orr, Don	Vershire, Vt.		Chelsea, Vt.
Orr, Wm. J.	East Ryegate, Vt.	Rathburn, R. H.,	
Orvis, C. M.	R. F. D. 3, Bristol, Vt.		R. D. 1, Bristol, Vt.
Osgood, L. K.	Rutland, Vt.	Rawson, Noble H.	Windham, Vt.
Osgood, O. D.	Cabot, Vt.	Rice, A. M.	Jefferson, Vt.
Owen, M. J.	Barton, Vt.		

Richards, John	Bethel, Vt.	Spaulding, R. A.,	West Charleston, Vt.
Richardson, H. B.,	Union Village, Vt.	Spaulding, Willis L.,	Proctorsville, Vt.
Riford, H. P.	Proctorsville, Vt.	Spear, Charles L.,	West Newbury, Vt.
Rinter, J. M., Mgr.,	Burlington Evaporator Co.	Spear, F. F.	West Newbury, Vt.
	Burlington, Vt.	Spear, Mrs. J. P.,	West Newbury, Vt.
Roberts, J. W.	St. Johnsbury, Vt.	Spear, J. P.	West Newbury, Vt.
Roberts, M. B.	Rupert, Vt.	Spear, Mrs. R. N.,	West Newbury, Vt.
Robinson, D. F.	Pawlet, Vt.	Sprague, George K.,	Randolph, Vt.
Robinson, Frank F.,	West Danville, Vt.		Randolph Ctr., Vt.
Rogers, C. L.	Newport Ctr., Vt.	Squires, H. C. & Son, .	Newport, Vt.
Rogers, B. O.	West Newbury, Vt.	Stearns, Collins . . .	Perkinsville, Vt.
Rollins, Nathaniel & Sons,	Middlesex, Vt.	Steavens, S. J. . . .	West Newbury, Vt.
	Barnet, Vt.	Stebbins, E. W. . . .	Cambridge, Vt.
Rowe, E. L.	Putney, Vt.	Stewart, Floyd E. . .	Eden Mills, Vt.
Rugg, F. L.	Montpelier, Vt.	Stiles, R. G.	West Glover, Vt.
Rumney, G. H.	East Middlebury, Vt.	Stoddard, Price A. . .	Andover, Vt.
Russell, C. E.	Cuttingsville, Vt.	Stone, Mason S. . . .	Montpelier, Vt.
Russell, Frank L.,	Cuttingsville, Vt.	Stone, O. B.	Eden Mills, Vt.
	Cambridge, Vt.	Storey, G. E.	Burlington, Vt.
Ryan, Earl M.		Story & Hicks	Essex Jct. Vt.
S		Story, L. L.	East Fairfield, Vt.
Salmon, N. K. & Arthur,	Glover, Vt.	Strawn, N. W.	Orleans, Vt.
	Barre, Vt.	Strong, Fred W. . . .	Montpelier, Vt.
Sanders, B. E.	Marshfield, Vt.	Strong, S. H.	Moretown, Vt.
Saxby, E. H.		Swan, P. B.	Montgomery, Vt.
Shattuck, D. A. & Son,	Londonderry, Vt.	Swanton, F. V.,	R. F. D., Orleans, Vt.
	Eden, Vt.	Sweeton, A. W. . . .	Brattleboro, Vt.
Shattuck, H. W.	Eden, Vt.	Sykes, Aurelius . . .	Hinesburg, Vt.
Shattuck, R. L.	Eden, Vt.	T	
Schayltz, L. Jos.	Eden, Vt.	Tabor, H. S.	Montpelier, Vt.
Schillhammer, Carl R. .	Jericho, Vt.	Taft, C. E.,	R. D. 5, Brattleboro, Vt.
Scribner, H. F.	Plainfield, Vt.	Taft, John	Brattleboro, Vt.
Scott, C. G.	Newport, Vt.	Tanner, H. E.	Marshfield, Vt.
Shepard, W. F.	Barre, Vt.	Teer, Frank	West Rutland, Vt.
Sherlaw, Edward C.,	Newport Ctr., Vt.	Tenney, E. C., Mgr.,	Scott Farm
	South Londonderry, Vt.		Brattleboro, Vt.
Shine, Edwin W.,	Peru, Vt.	Thomas, R. B.	Guilford, Vt.
Simonds, E. C.	Perkinsville, Vt.	Thomson, J. Edward,	Landgrove, Vt.
Simpson, A.	Lyndonville, Vt.		East Corinth, Vt.
Simpson, W. Arthur,	Vershire, Vt.	Thompson, J. F. . . .	Norwich, Vt.
	Small Bros., Manufacturing Co.,	Thorburn, Andrew . . .	West Halifax, Vt.
	Richford, Vt.	Thurber, N. E. . . .	Richmond, Vt.
Small, F. H.	Huntington, Vt.	Tietz, Wm.	Dorset, Vt.
Smith, Alvin H.	Danby, Vt.	Tifft, Edgar F.	Newport, Vt.
Smith, Alson	Plainfield, Vt.	Tuller, Fred V. . . .	Tunbridge, Vt.
Smith, A. J.	Barton, Vt.	Turner, T. A.	Weston, Vt.
Smith, Allen	Cabot, Vt.	Tuxbury, W. H. . . .	West Newbury, Vt.
Smith, Clarence F. . . .	Peru, Vt.		
Soule, George H.	Fairfield, Vt.		

V

Wheaton, Chas. J. Passumpsic, Vt.
 Whitehill, E. M. Derby, Vt.
 Vail, Homer W. Randolph, Vt.
 White, Enos R. West Rutland, Vt.
 Vt. Farm Machine Co., ... Whitcher, J. R. Groton, Vt.

Bel lows Falls, Vt. Wilber, Frank Rochester, Vt.
 Wilber, Seth Moretown, Vt.

W

Wade, A. P. Moretown, Vt.
 Wilcox, F. H. East Brookfield, Vt.
 Walbridge, Mrs. E. P. Cabot, Vt.
 Wilder, L. O. Middlesex, Vt.
 Walbridge, E. P. Cabot, Vt.
 Winn, S. E., ...
 Walbridge, Earl M. Marshfield, Vt.
 West Chesterfield, N. H.
 Walbridge, F. M. Cabot, Vt.
 Wood, Geo. M. Waterbury Ctr., Vt.
 Walbridge, Maurice Cabot, Vt.
 Woodruff, W. S. & Son,
 Walker, B. J. West Rutland, Vt.
 Cambridge, Vt.
 Walker, H. I. Weston, Vt.
 Wright, Arthur,
 Walker, Lewis M. Weston, Vt.
 R. F. 2, Bradford, Vt.
 Walter, E. N. East Haven, Vt.
 Wright, W. J.,
 Warner, G. F. Chester Depot, Vt.
 Montgomery Ctr., Vt.
 Washington Co. Farm Bureau,
 Wright, Carlos & Son,
 Montpelier, Vt.
 Bradford, Vt.

Waterhouse, C. E. Craftsbury, Vt.
 Wyman, Ned W. Cambridge, Vt.
 Watson, Charles Derby, Vt.
 White, Eons R. West Rutland, Vt.

Weeks, A. B. Stowe, Vt.
 Wells, Leon Bakersfield, Vt.

Y

West, Ernest H. Dorset, Vt.
 York, William B.,
 Wetherby, E. G. Danby, Vt.
 R. F. D. 4, Bristol, Vt.
 Wetherby, Omar M. Danby, Vt.
 Young, J. R. F. D. 4, Orleans, Vt.
 Walker, M. J. Montpelier, Vt.



